

A Demographic Study of Alston with Garrigill Poor Law Union

With Reference to the Health and Lifespan of the Mining Population

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Introduction

The Northern Pennines has been one of the most productive lead mining areas in England and the history of the mines has been the subject of several works; the mines of Alston Moor have been discussed in detail by Fairbairn.¹ The parish includes the town of Alston together with the villages of Garrigill, Nenthead and the smaller settlements of Nenthall, Nentsberry, Galigill, Leadgate and Bayles. The Alston with Garrigill Poor Law Union came into being in 1837 following the Poor Law Amendment Act of 1834. The Union included Alston Town, and the villages of Garrigill and Nenthead. The boundaries shown in Figure 1 are identical for the districts of Alston/Garrigill PLU, Alston/Garrigill Registration District and for Alston Sub District. In 1974 the civil parish of 'Alston with Garrigill' was renamed 'Alston Moor'.

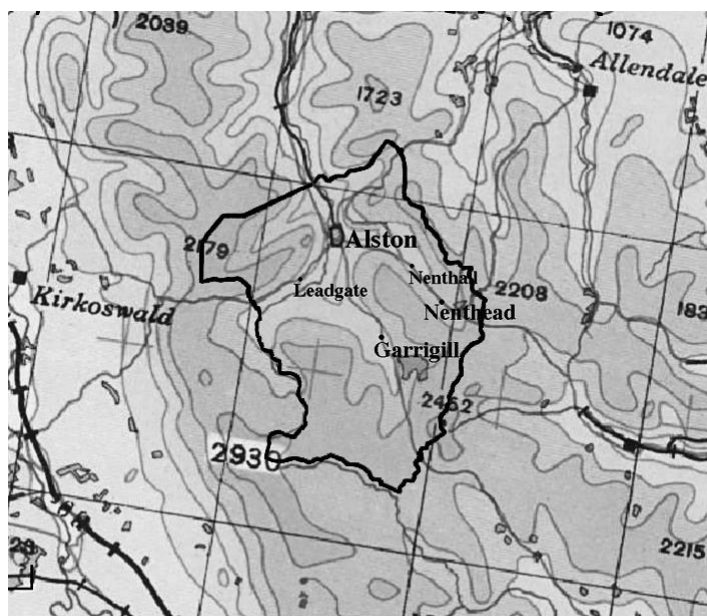


Figure 1. Alston with Garrigill PLU, Alston Registration District and Alston Census Sub District.

Source: A Vision of Britain through Time. URL: <http://www.visionofbritain.org.uk/unit/10044236/boundary>

Lord Hylton sold the whole estate and mining rights of Alston Moor for £2,500 in 1629 to Sir Edward Radcliffe the 2nd Earl of Derwentwater. The estate was lost by James Radcliffe the 3rd Earl of Derwentwater for taking part in the Jacobite rebellion of 1715.

The Derwentwater estates were confiscated by the crown in 1716 following the execution of James, but later returned on appeal to John the son of James Radcliffe; John died without an heir in 1731 when the land returned to the control of the crown. On the 15th May 1735 the land was granted to the Royal Hospital for Seamen at Greenwich.

During the 19th century the major leaseholder and employer in the area was the 'Governor and Company for Smelting down Lead with Pit Coal and Sea Coal' (the London Lead Company), who also owned mines in Northumberland, Weardale and Teesdale. There were many other smaller companies and the history of their ownership has been described in detail by Fairburn¹. The Blakett/Beaumont Company operated mines in adjacent areas from bases at Coalcleugh and Allenheads as well as elsewhere in the North Pennines.

The Aim of this paper is to collect and review statistical evidence relating to the mortality and migration of population in the Alston district in the 19th century.

It is intended to address the following questions: —

Which factors affected the population size of the Alston district between 1831 and 1901?

Was the age at death of lead miners in the Alston district less than that of the general population?

Which factors affected the length of life of these miners?

What was the average age at death of miners?

Population Change.

When looking at and comparing population figures in order to retain comparability the statistics for Poor Law Registration Unions/Districts have been used whenever possible.

The population figures given in the Census reports of 1801 to 1911 offer an insight to the changes, which have taken place in the Alston and Garrigill District. It is unfortunate that the method of recording the figures varied, in 1801 to 1891, with the exception of 1811, give the population of Garrigill chapelry, but figures for Nenthead Chapelry are only given for 1851 to 1901. This makes comparison of the districts within the Alston Poor Law Union difficult.

Year	Population	Year	Population
1801	4746	1861	6404
1811	5079	1871	5680
1821	5699	1881	4621
1831	6858	1891	3384
1841	6062	1901	3134
1851	6816	1911	3075

Table 1: Population of Alston & Garrigill District. Source: Census Reports

The population of Alston grew reaching a peak in 1831, then began a gradual decline, there was an increase in population between 1849 and 1852, with the influx of railway workers employed in constructing the Haltwhistle to Alston Branch Line which was opened in 1852.

The population figures for Nenthead show a similar pattern but in the case of Nenthead the peak occurred in 1861.

As the 1841, census report did not give the population of Nenthead as a separate figure, the number given has been calculated by using the 1851 Nenthead census area as a basis.

Year	Population
1841	1762
1851	1964
1861	2040
1871	1811
1881	1419
1891	1013
1901	1057

Table 2: Population of Nenthead. Source: Census Reports

The population figures for Garrigill are given in Table 3, which shows the decline in numbers but with two peaks 1831 and 1861.

Year	Population
1821	1288
1831	1614
1841	1474
1851	1143
1861	1447
1871	1242
1881	914
1891	662

Table 3: Population of Garrigill. Source: Census Reports

Changes in population size are due mainly to availability of employment, & emigration, and the later is also effected by the availability and price of food.

The employment of the area was based on two main industries farming and lead-mining. These two industries required a supporting infrastructure, which was supplied locally, Corn Mills, Woollen Mill, Brewery (later stocking factory), Smiths, as well as the various shops to supply the needs of the miners & farmers. It was the variations in the fortunes of the lead mining industry that had the greatest impact, a reduction in lead mining had a rebound affect on all the other supporting industries, so it was not just the miners themselves that were effected but the whole population.

The price of lead was determined by the demand and degree of availability of lead to meet market demands, and the price obtained for lead determined the number of miners employed.

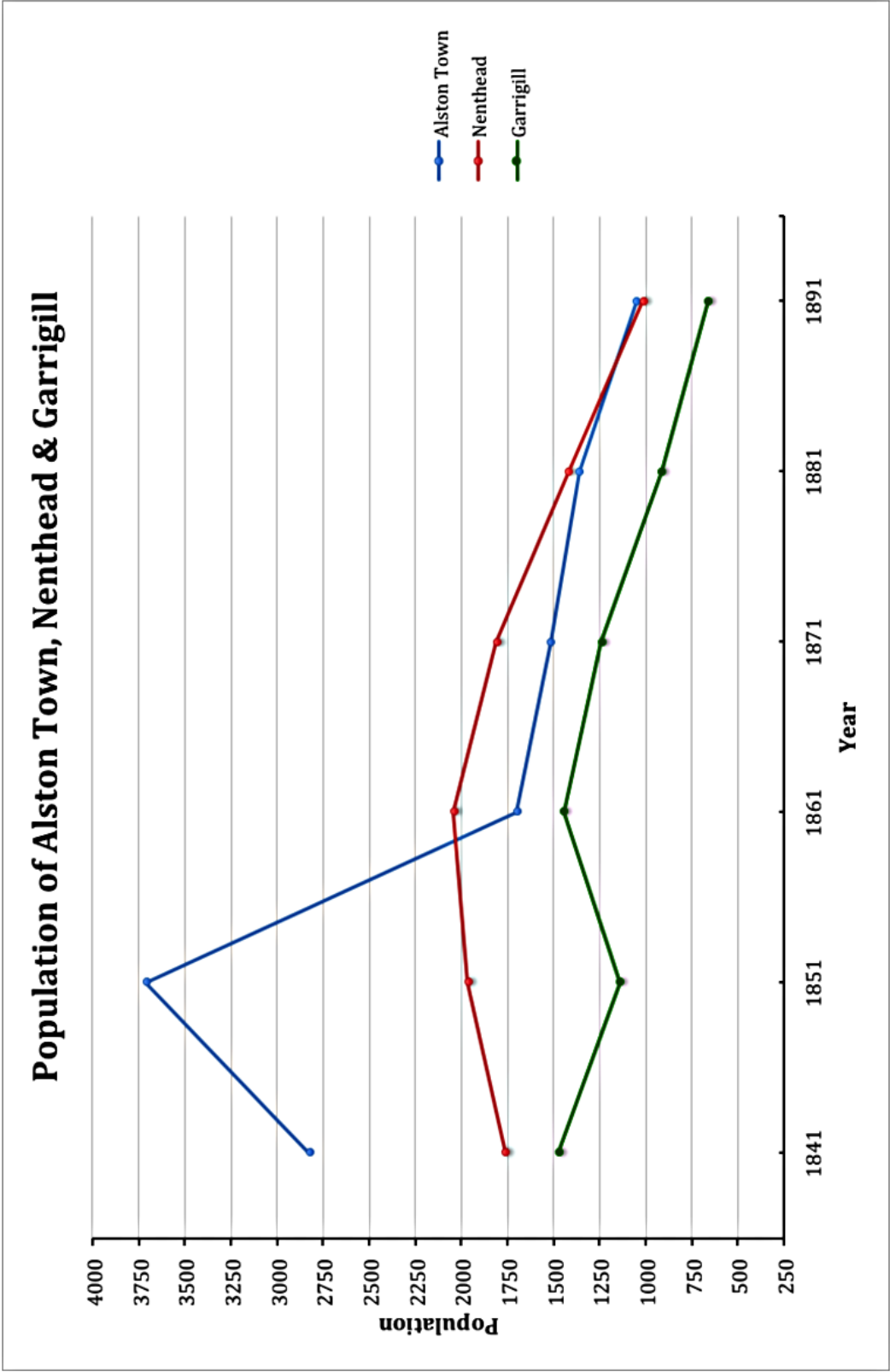


Fig. 1

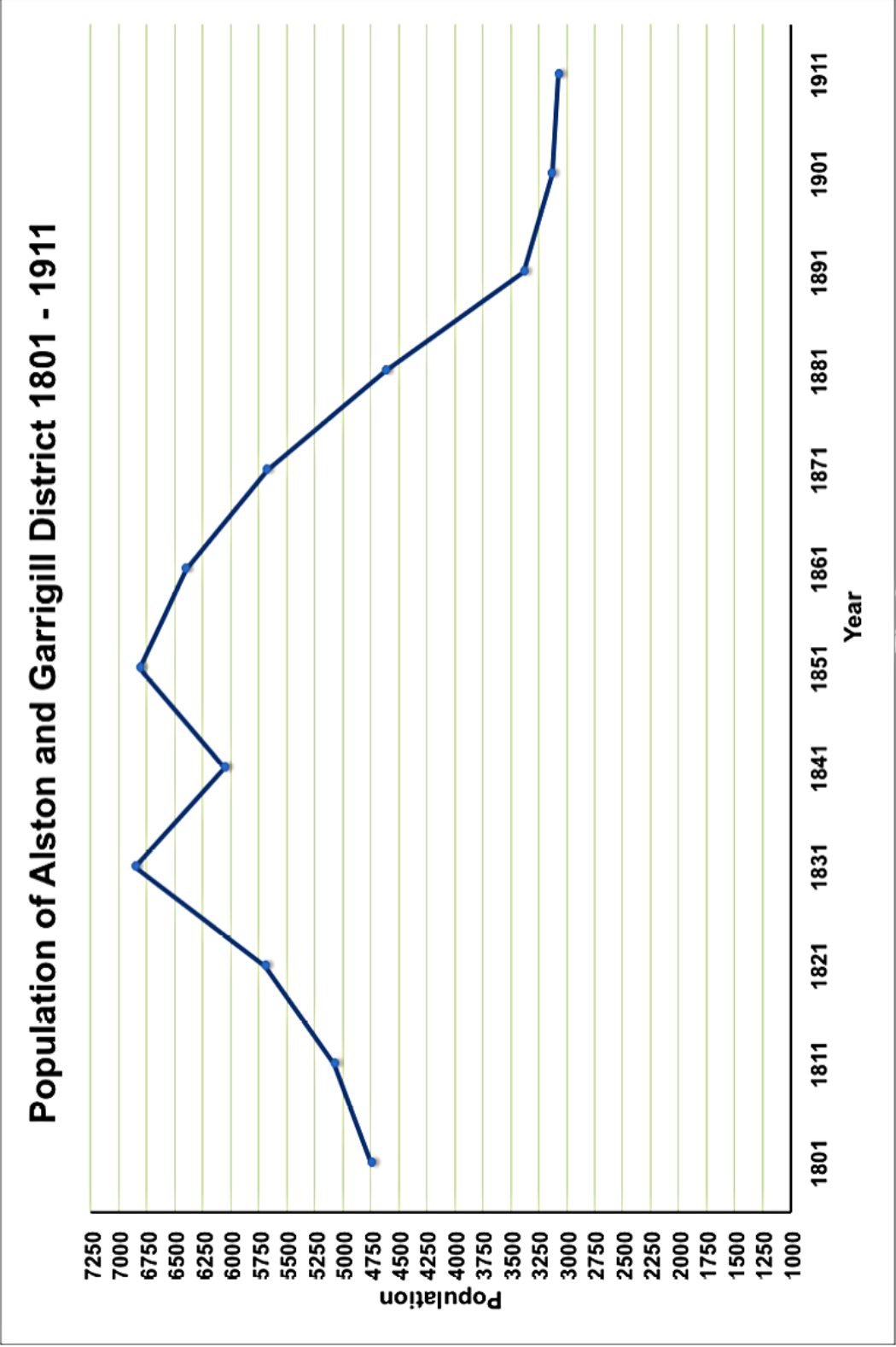


Fig. 2 Source: "A Vision of Britain Through Time" University of Plymouth

Decennial Change in Population For Alston & Garrigill District 1801 to 1911

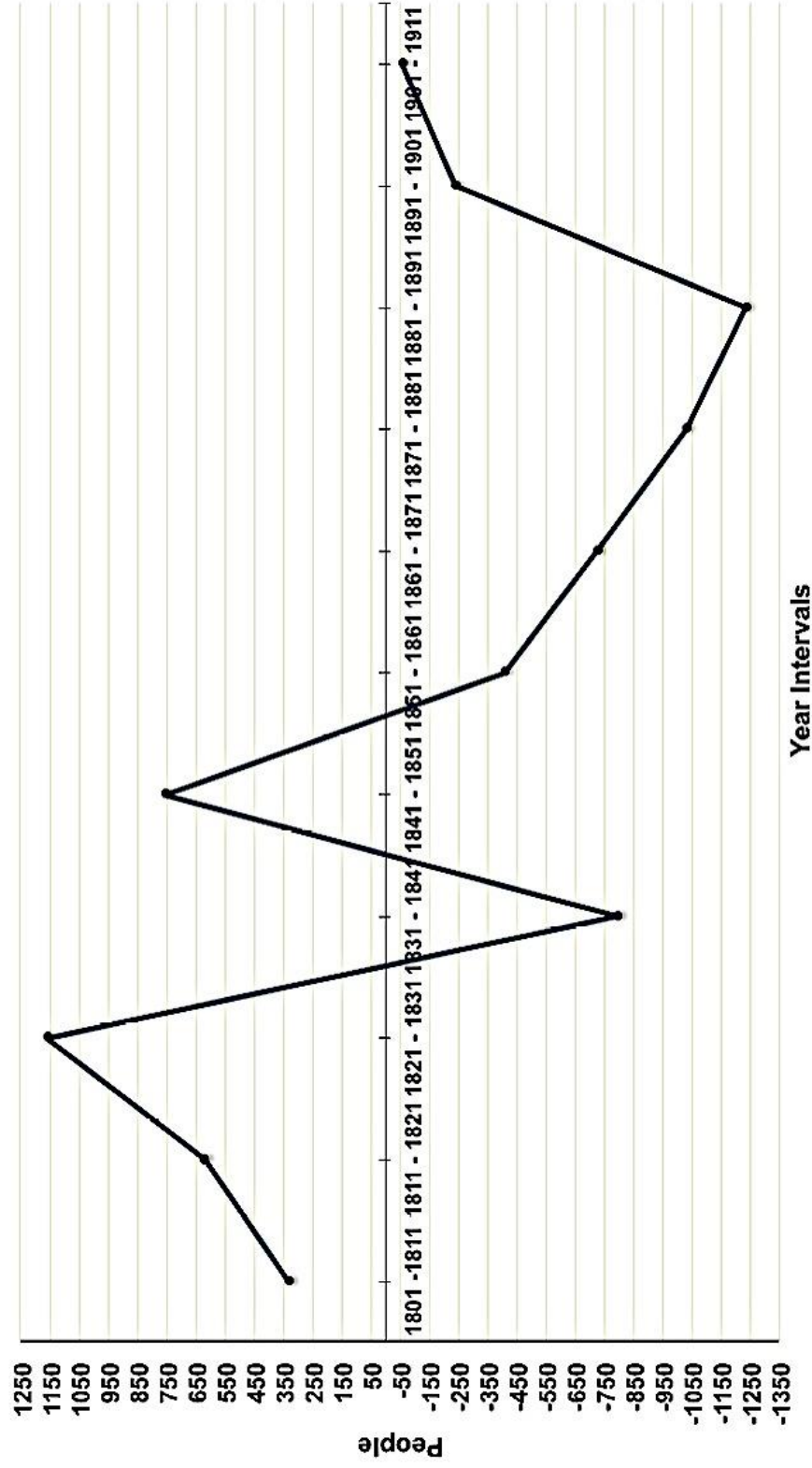


Fig. 3 Source: A Vision of Britain Through Time" University of Plymouth

At a meeting of the Committee of the Miners Appeal, held at Alston on 9th February 1818, it was resolved that the following petition was to be inserted in the Newcastle Courant and other papers.

**TO THE LORDS OF MANORS, AND PROPRIETORS OF LEAD MINES,
AND TO THE MINING ADVENTURER.**

The Petition of the Miners, Tradesmen, Landholders, and the Inhabitants in General of the Parish of Alston, in the County of Cumberland, Humbly sheweth —That in this Parish there are ancient and very extensive Lead Mines, and a great proportion of the Population is composed of labouring Miners.

That in consequence of the low price of Lead, the Wages of the Miners have been so greatly reduced as to subject them to very severe privations and distress, and a very great additional burden has been laid on the Parish.

The Average of the Poor Rate for the last year amounted to Eleven Shillings in the Pound on the Rack Rent, and at this time requires Twelve Shillings in the Pound; and notwithstanding every attention and economy is practised, the Rate is still increasing, the aggregate number of Paupers being at present upwards of eight hundred, out of a population of about five thousand.

In the hope of better times, your Petitioners have borne their distresses with patience and fortitude, and their industry has been unremitting.

Your Petitioners therefore humbly pray, that you will be to take their situation into your serious consideration and adopt such measures as may tend to advance the Price of Lead, and by thus enabling the Adventurer to afford better wages to the miners, to relieve us from a state of distress and misery hitherto unparalleled. And your Petitioners will ever pray. (Signed by upwards of 1000 Signatures).

This decline in the lead trade had led to a number of the residents of Alston emigrating to Canada, The Montreal Gazette of 15th July 1818 recorded the arrival of 128 settlers from Alston Moor arriving on the brig Jason.

In order to raise money to fight the war against France the government imposed taxes on imported and exported lead, this tax on exported lead was a major difficulty for the lead companies.

On 31 December 1814 Martin Morrison² wrote to Mrs Beaumont asking for Colonel Beaumont's signature on a petition for a reduction on the Export duty on lead. He also said that:

"... The American Peace, combined with the success of this proposed measure, will I hope improve the price of lead."

Martin Morrison in a letter to Mrs Beaumont dated 28th December 1815³ stated "It is indeed most desirable that Government adopt measures soon, for the relief of the miner otherwise the consequence will shortly be felt, and none however large their fortune will be exempt from difficulties resulting from the depressed state of the lead market.

"I have had a meeting with the mine agents, and every practicable reduction in the price for raising ore, and of labour will be forthwith adopted but unless the relief sought for in the repeal of the duty is accorded, I despair of any benefit being desired from the mines. If it were possible to ascertain Lord Liverpool's intention on the subject of the memorial it would be of interest to your concern."

In 1816 by Cap. 18. the export duty on lead was suspended until the fifth day of April 1820; this suspension was extended to June of 1820. (by Cap. 12.) Unfortunately for those exporting lead to the United States of America, a tax on

lead imports was imposed by them in 1816 of 20 percent Ad Valorem (that is a tax of 20% of the value of the lead imported).

In 1825 the import duties on foreign lead were changed, the results of this act are described in a memo, which was sent to Mr Fenwick agent to the Bishop of Durham on 8 April 1826⁴.

"This duty on foreign lead imported previous to 5 July 1825 was 20 percent Ad Valorem so that if the price of Pig lead was at £22 per Ton, the amount would be £4 8s per Ton. The duty charged since the 5 July 1825 is £2 per Ton without reference to value difference is £2 8s.

"The protection given to English mines having ceased, by the high duty being withdrawn, the importation of foreign lead last year exceeded in quantity that of any former one, and amounted to upwards of 3,500 Tons or 7,000 Pigs and by which a reduction in the price of English lead has since July 1825 taken place, of at least 20 percent, and if the encouragement to the importation of foreign lead and lead ore is continued, of which judging of the proceedings of the legislature, there can be no reasonable doubt, it is difficult to say the extent of injury of distress that await the English lead mines. Recently lead has been sold at Stockton at £19, £18 and even so low as £17 per fother of 22 cwt's.

"The duty on Foreign lead ore previous to the 5 July 1825 was £1 16s per Ton the duty since the 5 July 1825 is ten shillings per Ton, and according to information recently obtained the quantity of lead ore imported into Liverpool since the adoption of this low duty, has been 2,000 tons, a great part of which has been smelted into lead."

There were further changes to the duties on imports, in 1828 the duty on imported lead was further reduced to £1 5s 0d

The following report appeared in the Times dated 2nd April 1828

House of Commons Tuesday April 1st

Foreign Lead and Lead Ore

Lord LOWTHER presented a petition from a most respectable class of persons connected with the lead mines situate at Alston Moor, in the county of Cumberland, complaining of the depreciation in the value of British lead, in consequence of the low rate of duty payable on the importation of foreign lead ore. ... He was aware that the importation of foreign ore was not the only cause of the depreciation complained of; it might in some degree be attributed to the general stagnation of trade, but the petitioners believed that the chief cause was the admission of foreign ore at a low duty.

Mr. C. GRANT said, his noble friend himself had the candour to allow that other causes than the importation of foreign ore had led to the distress complained of; and indeed there were other causes, sufficiently obvious, which abundantly accounted for it. Circumstances which affected other speculations would also affect that of lead mining, and would cause a depreciation in the value of the article. One real cause, however, of the depreciation was, that other countries were now capable of supplying neighbouring states. This country used to supply many parts of Europe with lead, which now drew their supplies from Spain. France, Italy, and Holland, who formerly received their supply from England, for the last few years, had it from Spain. But still notwithstanding this competition, England continued annually to export 14,000 tons of lead. Now, when it was recollected that this country produced 40,000 tons of lead yearly, and exported 14,000 tons, while only 5,000 tons were imported, surely they could not say that the trade was in such a very deplorable state. Under all the circumstances, it appeared to him that the complaint of the petitioners was founded in misconception.

The increased imports of foreign lead drove the market price of lead downwards, and by 1830 the London Lead Co. was in financial difficulty as reflected in the minutes of 9th December 1830.

“The Court taking into consideration the necessity of making every practical reduction in the expenses of the concern.

“Resolved that the refreshments prepared for the Court be discontinued from the 29th of the present month. That the newspapers and all periodical works be discontinued and that no book or any article whatsoever be ordered without the sanction in writing of the Governor.”

The company had borrowed £42,000, in order to keep operating, and had to borrow money again to pay money back to the banks.

The Company’s labour force was greatly reduced from 1,057 miners in 1829 to 574 in 1833.

**Average Number of Pickmen, labourers & washers
Employed at Alston Moor**

Year	Persons	Year	Persons
1821	1326	1831	1158
1822	1358	1832	866
1823	1441	1833	825
1824	1506	1834	855
1825	1525	1835	991
1826	1437	1836	1080
1827	1474	1837	1092
1828	1387	1838	1081
1829	1463	1839	1063
1830	1361	1840	1088

Source: Appendix 6, “The Lead Miners Of The Northern Pennines” C J Hunt

The lead trade did not exist in isolation from other economic factors, there was a general recession throughout the country caused by the blockade of ports during the war with France and America which caused price increases and increased unemployment that led to increased poverty throughout the country.

In 1811/12, harvests in European countries were hit by a combination of droughts and floods, and in 1816 following the eruption of Mount Tambora, on the island of Sumbawa in Indonesia in 1815, a cloud of volcanic ash resulted in a year without a summer, heavy floods in spring, snow in June & July resulted in harvest failures. The implementation of the Corn Laws which maintained artificially high prices by imposing a heavy duty on imports kept the price of bread high. All factors which would encourage emigration.

On the 22nd March 1822 the Court minutes record a donation of £25 was to be given towards a fund in the Parish of Alston to assist “such poor persons who wish to emigrate to Canada.” This appeal raised £310 16s which paid the expenses for 124 people from Alston to emigrate.

On Thursday the 29th March 1832 the Lead Company minutes record:

“The Governor reported that during the last year they had to contend not only with extremely depressed markets but an unusually small demand for lead. He reported that there had been a considerable reduction in their annual expenditure, but that it is essential that the Company continue to open new ground undertaking trials for new veins, and that with the present low rate of labour intends to push these trials to termination.

"Every practicable reduction has been made in the rate of wages but the Court cannot feel insensible to the increased and severe distress that would arise from the sudden dismissal of a large number of their workmen who have served the Company satisfactorily in more prosperous times and who it is but fair to state have submitted to the necessary privations with a meritorious degree of patience and contentment."

"The large supplies of lead furnished by the Spanish and other foreign mines have so interfered with the British Export Trade, that it is to be apprehended much increase in the price of lead cannot be expected while these supplies continue."

Figure 4 shows that the price of lead had fallen from a peak of £41 8s 0d in 1806 to £13 8s 0d in 1833 (R. Burt 1984) forcing the lead companies to reduce their labour force which is reflected in the following newspaper report of the time.

12th May 1832 (Newc. Journal)

Alston Moor. During the last week upwards of a hundred individuals have left Alston for the purpose of emigrating to North America by the ship Samuel, now lying at Maryport, bound for Quebec. The persons thus expatriating themselves, are chiefly miners, who, from the ruinous depression of the lead trade, have long been out of employment, exposed to a situation of extreme misery and want. They are sent from Alston by means of a subscription raised in their behalf, and many of the suffering heads of families feel that they are driven from their native home to seek a precarious subsistence in the gloomy forests of Canada. Thus are we, step by step, losing the real strength of our population, and well may the people of Alston Moor, who, though not Political Economists have at least common sense, exclaim, "So much for the Free Trade system, which within one twelve-months has deprived us of about two thousand of our inhabitants, who in better times used to diffuse plenty to all around, by spending their earnings amongst their neighbours!

7th April 1832 (Newc. Courant)

EMIGRATION.

The following is a correct list of the prices of grain and wages in Lower Canada: — Wheat per bushel 4s. 6d., Rye about 3s., Maize 2s. 6d., and Oats 1s. 3d. Wages of labourers 2s. 6d. per day; shipbuilders, carpenters, joiners, coopers, masons, and tailors, 5s. per day. From a calculation made with respect to Upper Canada, it appears that the yearly wages of labourers there hired by the year, are from £27 to £30, monthly wages from £1 10s. to £3 10s; daily wages from 2s. to 3s. 9d. In all the above rates of wages, board and lodging are found by the employer; without board, daily wages vary from 3s. 6d. out of harvest, to 5s. in harvest time. The wages given to mechanics may be stated to be from 5s. to 7s. 6d. per day. In New Brunswick, the expense of living, and the rate of wages, is somewhat the same as in Lower Canada; but it may be remarked that when labourers have become better acquainted with the work of a particular colony they may be able to get increased wages. The mechanics most in demand are those connected with house building. Shoemakers, tailors, and ship-builders also, find plenty of employment. The following are the prices of a few articles of necessity in New Brunswick: —Bread, the 4lb. loaf, 10d.; Beef, per stone, 3s. 3d.; Mutton, 2s. 6d.; Pork, 2s. 0½d.; Veal 2s. 4d., Salt Pork, £4 15s. per barrel. Coals are about 30, per chaldron. House rent at St. John's is from £5 to £6 for families occupying one room, and for families occupying two rooms, from £6 to £10.

29th March 1834 (Newc. Journal)

The Lead Trade.

The mining district in this and a neighbouring county, for a considerable time past have been very much depressed owing to the state of the Lead Trade; and the town of Alston in particular, has been almost half depopulated by the circumstance, many of its inhabitants having emigrated to America, and others removed to the coal districts, in search of employment. The value of property has, of course, been greatly deteriorated, and there

are said to have been 200 empty dwellings in the small town. We are happy to state that such an improvement has lately taken place, as to afford hope of ultimate restoration of the town and trade of Alston Moor. Two years ago, Lead was as low as £12 per ton, and we understand it has lately been sold in the neighbourhood at upwards of £18 per ton.

As previously stated there was an increase in the population around 1851, this was the result of two factors. The arrival of the workforce required to build the Haltwhistle to Alston railway, and an increase in the value of lead which resulted in an increase in the numbers employed in that industry. The 1851 census shows 98 railway workers with 29 family members, also 11 quarry & stone workers, and an additional 23 individuals labourers, joiners etc., and their families from out of the area who were not on the 1861 census who may have been involved with the building of the railway. One hundred and sixty one individuals cannot account for the increase in the population even allowing for an increase in other associated employment. There is however an increase in the number of men employed in the lead industry at this time. In 1849 the average price of Pig Lead per foddors was £16, rising to a high of £24 in 1856⁵ this is reflected in the London Lead Company Half Yearly Minutes

21st March 1850 LLC 39

"The Governor informed the Court that the Court of Assistants had taken into consideration the State of the Company's Affairs, and especially the improved prospects of their mining operations, and also the advance which has recently taken place in the market value of lead do recommend as their opinion that a dividend of 10 shillings per share be made ..."

20th March 1851 LLC 39

"The Court of Assistants recommend that a dividend of 10 shillings per share be made to the proprietors for the half year ending at Ladyday next, without any deduction for income tax, and adverting to the communications which were made to this Court at the corresponding meeting the two previous years, your Court of Assistants have the satisfaction to state that the anticipated improvement in the prospects of the concern which encouraged them to recommend a continuance of dividends on those occasions has been realised."

The Census returns give the following information, for the Alston District.

Year	Lead Miners, Smelters, & Washers
1841	1227
1851	1380
1861	1271
1871	904
1881	502
1891	343
1901	303
1911	297

The above table does not include labourers, cartmen, or drivers, at the lead mines as there is a lack of consistency in the recording of these occupations in the census reports.

Between 1851 & 1861 there was a fall in the size of the population of Alston of 346 people, could this be a more accurate reflection the impact of the building of the railway, had made on the population?

The table above shows a fall in the numbers of lead miners etc., but despite this there was a notable rise in the population of Nenthead recorded in the 1861 census, this is reflected in the increased wage costs of the London Lead Company.

This increase in labour was most likely due to an increase in the market price of lead, the company records show the following: —

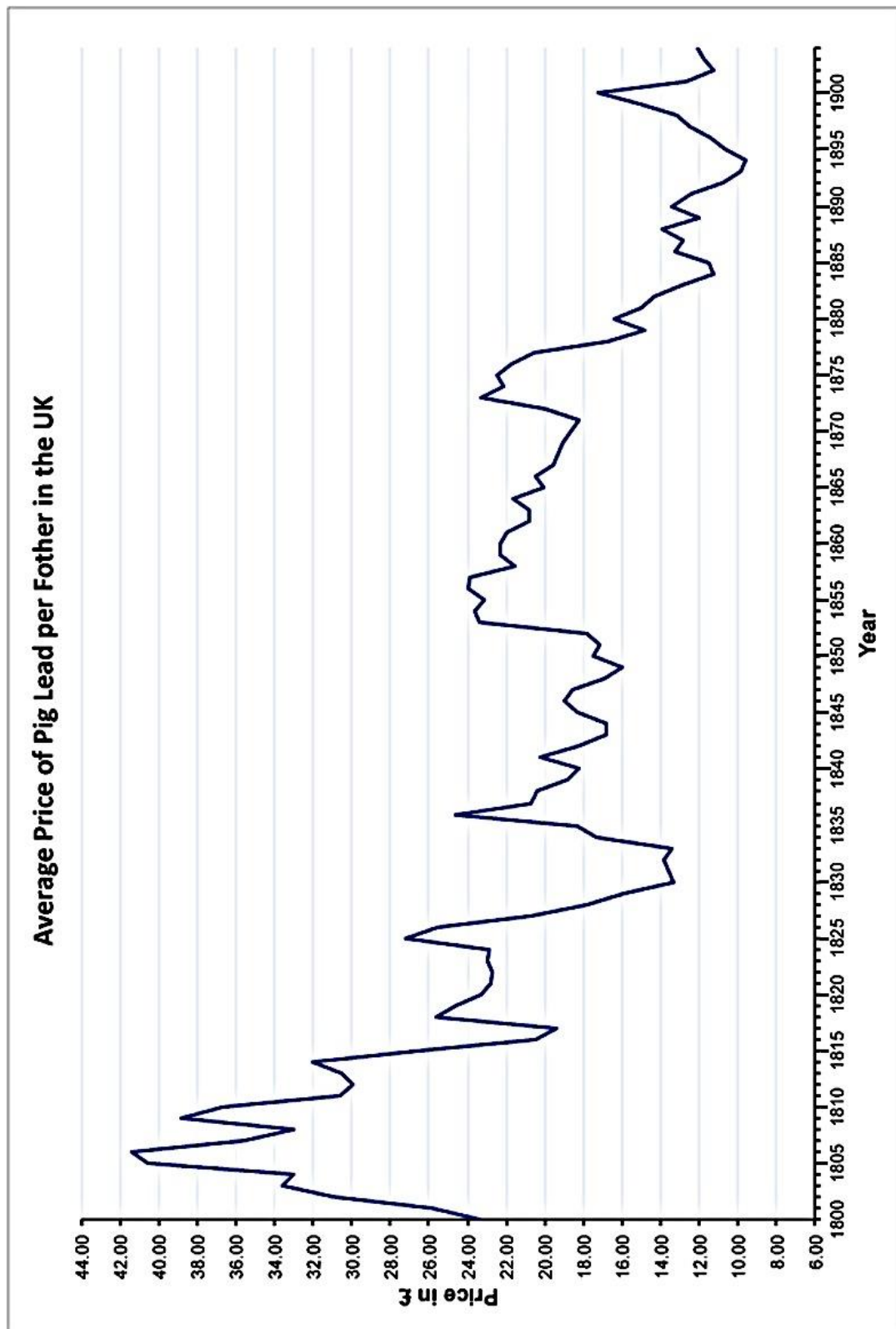
Year	Amount of Recorded Income £	Wages, Costs etc in the North £	Qty of Lead Ore Raised in Tons	Value of Lead products Sold in £	Qty of lead products sold in Tons	Av price of lead ton £	Qty of Silver Troy oz	Value of Silver Sold £
1850	89711	88000	9656	84841.52	5256.6	16.14	49,283	11088.68
1851	72836	88000	9720	82432.60	5017.2	16.43	58,493	16116.04
1852	140516	89300	7944	187732.43	10770.7	17.43	58,081	16002.53
1853	89469	94800	6647.6	104962.66	4652.6	22.56	58,768	16314.24
1854	118554	107900	9767.2	123487.80	5473.8	22.56	54,196	15101.49
1855	106735	121800	8903.6	138169.62	6335.2	21.81	58,144	16050.17
1856	96413	126500	10057.2	112938.80	4810.0	23.48	63,670	17675.06
1857	159674	115000	9960.4	164367.23	6979.5	23.55	62,460	17339.16
1858	135237	130300	9848	148885.05	6886.5	21.62	60,039	16722.61
1859	165098	128800	9517.8	143745.71	6498.5	22.12	59,643	16650.34
1860	146227	130000	9097.9	159586.35	7077.0	22.55	58,759	16372.95
1861	114114	130600	8703.8	130153.09	6245.4	20.84	58,848	16213.85
1862	130870	128800	9916.8	124261.01	5908.8	21.03	45,976	12715.24
1863	95189	124100	10038	110925.85	5384.8	20.6	53,943	14974.80
1864	116743	122400	9566	136931.90	6462.1	21.19	58,170	16239.13
1865	128545	124200	9995	160760.48	8006.0	20.08	55,555	15335.49
1866	151079	134900	10500	127923.73	5838.6	21.91	51,960	14451.38
1867	118024	131400	9420	91786.42	4360.4	21.05	55,155	15110.17
1868	95327	131800	9529	121558.08	6211.5	19.57	55,542	15187.27
1869	104663	108300	8701	151425.30	7995.0	18.94	47,894	13096.02

The Quantity of Lead Ore Raised includes Duty Ore.

In 1858, 1859 and 1860 the London Lead Company had prospered, as is indicated by the increased profits and output, the General Court minutes of 28th March 1861 tells us: —

“That during the year ending 1st November 1860 the demand for lead as well as its market value was so good as to enable the Court to sell most advantageously a large quantity of lead beyond the quantity raised in the year, which has of course contributed to the favourable results of the years operations.

That since the 1st November there has been a great stagnation in the trade and prices obtained for the quantity of lead they have sold in the period have been at lower rates than in the year 1860.”



The London Lead Company had a policy of maintaining a large reserve fund, which is how during downturns in the market they were able to maintain production and pay the miners, relying on an upturn, during which period they would be able

to sell their lead at a higher price. This is shown in the General Court minutes of 27th March 1862.

"The Governor and Court of Assistants regret to inform the Proprietors that the operations of the year ending the 31st October 1861 were not attended with results as satisfactory as in some previous years.

In the first place there was a considerable falling off in the quantity of ore raised as compared with 1860 and secondly the average price of lead was lower, doubtless owing to the general stagnation in the trade. It is however satisfactory to them to state that by withholding their produce from the market through the period of heaviest depression they were enabled to realise remunerative prices which would not have been the case had the Directors been forced to sell to meet the current expenditure."

The fortunes of the company varied between 1862 and 1870, as the following extracts from the General Court minutes show:

28th March 1865 LLC 39

"The Governor and Court of Assistants have the pleasure in laying before you the accompanying statement of the affairs of the Company for the year ending 31st October 1864, to call your attention to the satisfactory result of the operations of the Company for that period, which would have exhibited a still more favourable aspect had not the unusual drought of the last summer checked their washing operations and stopped the completion of the Dressing of the whole of the ore raised within the year. This ore however, whatever the quantity may prove, will of course assist the result of the coming year.

During the last year, as may be observed by a reference to the statement, the market demand for lead has been good and continued so till after last Christmas, since which period a great stagnation in the trade has occurred, not more however than what the Court believe to have taken place in most of their branches of business."

27th March 1866 LLC 39

"In our last years report, while congratulating our Proprietors on the satisfactory condition of the Company's mining prospects we called their attention to the extreme stagnation in the demand for lead. This stagnation continued for some months causing our stock, particularly of the Common qualities to accumulate to a considerable extent, and when at length the demand sprung up, prices ruled considerably lower than in 1864 and we were forced to clear off a large quantity of Common lead at prices that barely paid the cost of production. The produce of the mines has been quite as favourable as we anticipated, but the low price at which we disposed of our accumulated stock materially affected our average of sales and consequently the net profits of the year.

During the last five months prices have improved and our sales have been on the whole satisfactory. As far as the uncertainty of all mining operations will allow us to foresee, the Company's prospects are favourable.

We must not however close our report without drawing the special attention of the shareholders to the serious increase our expenditure in the shape of wages. It is of the great difficulties we shall have to contend with, and one over which we can have no certain control so long as the competition for labour prevails in the North."

26th March 1867 LLC 39

"The result of the operations for the year may upon the whole be deemed satisfactory considering the increased rate of wages which has arisen of late years, and is still maintained.

The prices for sales realised have been good and in excess of those of the last years, but the quantity of lead sold has not been equal to the quantity of ore raised and purchased, thereby creating an increased amount of stock in hand.

Had this increase of stock been sold in the year, it would have increased the profits for that period.

The yield from the mines has been good and the constant wet weather during the year most favourable for the washing operations consequently a larger proportion of ore than usual has been washed up, and brought into the mills, a circumstance very favourable to the result of the years operation.

Since the commencement of the current financial year the trade has been dull, but the Court believe that the lead trade has not been more so, than what is still the state of almost all other articles of commerce."

31st March 1868 LLC 39

"The Governor and Court of Assistants regret to have to lay before their Proprietors a less favourable statement of the results of their operations for the past year, than those, which they have had the pleasure to present for several years preceding.

In the report which they made to the Proprietors in March 1867 they referred to the dullness of the lead trade in common with all other branches of commerce from the commencement of their current financial year November 1866, and the continuance of the universal stagnation of trade since that period is so well known that the Proprietors cannot be surprised to learn that the profits of this Company have been correspondingly affected.

In the year ending 31st October 1866 the sales effected by the Company were not quite equal to the produce from the mines within the year, but the average price obtained from the sales during that year was good, and the result of the years operations under all circumstances satisfactory, but in the following year however, ending 31st October 1867 the amount of their total sales was only about two thirds of the produce of that year, and these sales could only be effected at a reduction on previous prices. This want of demand has ensured a considerable augmentation of the stock in hand, which of course tells unfavourably on the amounts now presented.

Since the beginning of the current year a somewhat better tone has prevailed and up to the present time, the Court have been enabled to sell a fair quantity of lead but they have been obliged to submit to a reduction in their prices below those of last year."

30th March 1869 LLC 39

"Were it not for the greatly reduced price of lead to which reference was made in last years report, the operations for the year ending 31st October 1868 would have been fairly satisfactory.

The ore raised amounted to 23,821 Bings being about equal to 6,600 tons of lead, and the sales effected 6,045 tons but the prices obtained show a very great reduction on previous years.

The average of the year referred to being £19 11s 4d a ton against £21 10s 11d in 1867 and £20 16s 6d as the medium of 5 years 1863/67. This falling off in the value of our own produce is a very serious matter as to a certain extent it must be attributed to the fact that of the late years many of the principle lead merchants have increased their own refining operations and with the scientific improvements which have been introduced many ores are being used for the manufacture of White lead which formerly would have been rejected.

The reduction in the rates of Royalty, or Duty ore, which have been obtained from Lords of the Manor, will in time the Court trusts be a considerable assistance to the Company's operations, and the present low price of lead as compared with late years has doubtless been one of the chief reasons which have weighed with our lessors in agreeing to these reductions, as however some of them are prospective the effect will not be fully felt for some time to come.

One favourable feature in our operations, it is right we should mention as a proof that any improvements which experience has pointed out as conducive to economy in the cost of production are adopted at our works. In former years the standard of calculation for the yield of the Company's ore was about 4 Bings to the Fother of lead, but from economy principally in the smelting operations it is now found that 3 Bings 6 cwt is ample, and indeed a further saving is evinced in our operations for the past year."

In the late 1870's the market for English lead collapsed, with the importation of foreign lead at a price that English mine owners could not match. From figure 5 it can be seen that UK imports of lead from 13,600 tons in 1850 to 110,000 tons in 1880, whilst the amount of lead ore produced fell from nearly 93,000 tons to 72,245 tons.

This reduction in lead production is reflected in the fall in the size of population in Nenthead a fall of 621 is recorded between 1861 and 1881, it was in 1882 that the Lead Company sold their works at Nenthead to John Cameron Swan's Company the Tynedale Lead and Zinc Company.

Emigration continued from the Alston and Weardale mining districts, a number moved to the Durham & Northumberland Coalfields, as well as emigrating to , America, Canada, Australia & New Zealand.

An article in the Hexham Herald of 21st May 1870, stated: —

"The number of emigrants from the locality since 9th March 1870 is 32, the last seven of whom left the Alston station on Tuesday morning last. They were Mr M. Dickinson, who had previously a very successful sojourn of eleven years in Australia and from which country he returned about two years since; Mr Jacob Walton, well known, throughout Hexham circuit, as well as in this locality, as a most acceptable Primitive Methodist Preacher, who with Messrs Robert Martindale, of Alston, and Robert Scott and Robert Davidson of Blaygill were bound for California; the destination of the other two, William Watson of High Plains, and George Dickinson of Nest being America. They were accompanied to the station by a number of friends and acquaintances, who seemed to grieve much more than the emigrants themselves of the prospect of a long separation from home and friends to whom they were ardently attached, and the trial and deprivations to be undergone in search of competence in a foreign clime."

The Hexham Courant of 16th March 1878 gives further news of emigration: —

"Several families from Alston and neighbourhood will we understand, start for Queensland on Monday next, others, not having been able to receive a passage in the same vessel, will follow next month."

On the 13th November 1886 the Hexham Courant reported: —

"Without, however referring further to those who emigrated some time ago, the following brief account of emigration of recent date that have taken place will not, it is hoped, be uninteresting to a portion of our readers: - On the 26th April three years ago, John P. Haldon and his wife left Alston for America. On the 30th November, 1885, James Keenleyside, watchmaker, and William Dixon, druggist's assistant, left Alston for Queensland. On the 5th January last, John Walton, tinsmith, left Alston and arrived at Sydney. On the 20th March last, John Storey, jun., and his wife (son of John Storey of Tynehead House near Alston), left home for Queensland. All the above parties have arrived safely at their respective destinations and have succeeded in finding employment. The last on my list are a young man of the name of Thomas Errington, a nephew of the late Thomas Pearson, of Alston, and his cousin, Jane Robinson, who left home on the 2nd inst., their destination being Port Elliot, Adelaide."

The movement away from Alston was not restricted to moving to Australia, Canada, and other foreign countries, there was a considerable movement towards the nearby industrial towns. This can be demonstrated by looking at the census returns for 1861 and 1891. The 1861 census for the Newcastle & Tyneside region shows 289 individuals born in Alston, in 1891 this had increased to 707. Families also moved to the other major towns in Northumberland, Durham & Yorkshire, as well as the coal mining towns, of Ashington, Blyth, Consett etc.

Some examples of this migration:

Ridley Erwin a lead miner in 1861, in 1881 a lead washer living at Westgate, Newcastle, in 1891, a foreman at the White lead works at Gallowgate.

George Angus a smelter at Nenthead in 1881, a lead smelter at Byker in 1891.

The Barron brothers George & Cowper were working as lead miners in 1871, in 1881 they were living at Byker, Newcastle working as lead smelters.

In 1881 Jeffrey Milburn was an unemployed miner, in 1891 he is a Chapel Caretaker living at Clarence Street, Newcastle.

In 1881 William White unemployed lead miner, in 1891 he was working as a warehouseman at Arthurs Hill, Newcastle.

Thomas Elliott an unemployed lead miner in 1881, in 1891 working as a lead miner at Cleator Moor.

Matthew Laws in 1881 a farmer in 1891 working as a machine man in Elswick Newcastle.

John Hymer, a lead miner and farmer in 1881, in 1891, an iron miner at Cleator Moor.

Joseph Nicholson lead miner & farmer in 1881, was working as a dairyman at Elswick, Newcastle in 1891.

Tinniswood Watson a farmer in 1881, previously a mining Clerk (his father had been a lead mine agent) in 1891 he was working as a machine wool comber at Haworth in Yorkshire.

The size of population of the district continued to fall, until the number of people (3075) living in the district in 1911 was less than half of that in 1861. There was a small increase in the population of Nenthead in 1901, which is probably associated with the developments undertaken by the Vielle Montagne Zinc Company.

With the decline in the lead industry there was an apparent associated increase in those employed in farming.

Year	% of Male Population involved in Lead mining	% of Male Population involved in farming
1841	39.05	2.05
1851	39.48	3.26
1861	39.34	5.14
1871	31.42	7.71
1881	21.84	12.21
1891	19.87	12.91
1901	18.99	11.96
1911	18.99	15.26

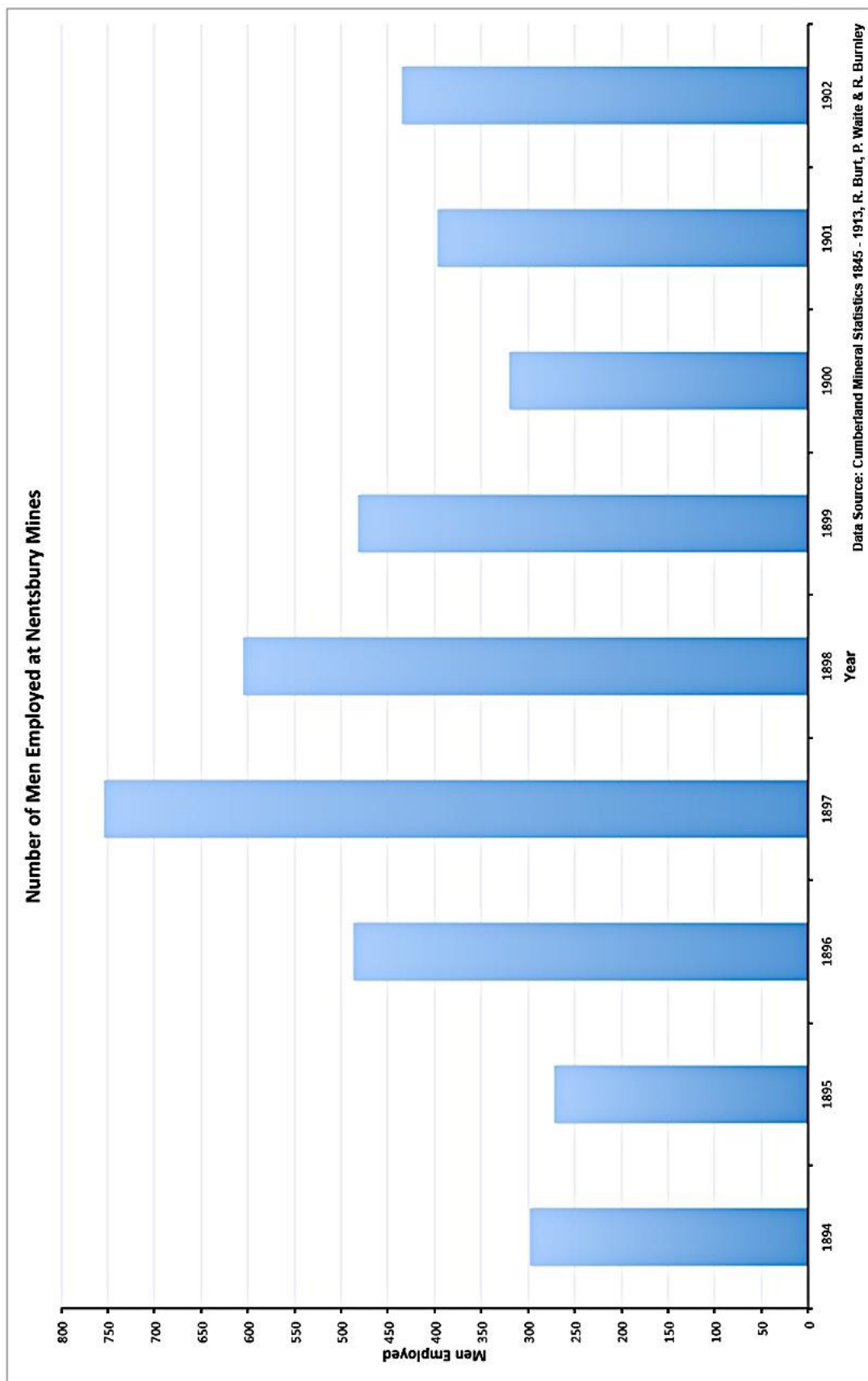


Fig. 5

The move towards farming is not surprising as the evidence of the census shows a history of lead miners (and other occupations) also being involved in farming to some degree. The tables below show the extent to which lead miners were also working as farmers.

In 1851	% of those Males listed as farmers
Farmer 1851 (no lead mining past)	68.09
Lead miner & farmer in 1851	31.91
Lead miner 1841, farmer 1851	7.09

As the mining industry deteriorated these figures changed:

In 1881	% of those Males listed as farmers
Farmer in 1881 (no lead mining past)	40.57
Lead miner & farmer in 1881	21.71
Lead miner in 1861/1871, farmer 1881	32.57
Farmer & smelter 1871/1881	4.57
Ore Washer & farmer 1881	0.57

It is also interesting to note that of the widows listed as farmers in 1851, 56% were widows of miners, in 1881 this figure was 61%.

There are a number of references made in public documents to lead miners also having small farms and gardens. The 1834 Poor Law Commissioners were told that the lead miner/farmers of Teesdale and Weardale had about three acres of meadow, three or four of upland pasture, with a house and offices necessary for accommodating two cows or a cow and a galloway.⁶

Arthur Raistrick describes the activities of the London Lead Company in promoting gardening and farming amongst the workmen⁷.

"The Company's interest in gardens is shown in the way in which every cottage that they built on any of their estates was provided with a garden adjoining, and in the many ways in which they fostered the love of gardens among the workpeople. At an early date a Horticultural Society was formed at Nent Head, and a similar one at Middleton, to both of which the Company were generous subscribers. Later, similar societies were founded at Garrigill and in Westmorland, for Dufton and Hilton. Prizes were offered each year by the Company for the two best cultivated gardens on each estate; at first each prize was 10s. 6d., but later this was increased to £2 2s. As demand for land in addition to the cottage gardens increased, the Company instructed its agents to purchase small lots of ground from half an acre to two or three acres, in suitable positions, and to let these out to their workpeople in allotments, at rentals varying from 2s. 6d. to 10s. a year.

In the replanned villages of Nent Head and Middleton-in-Teesdale, about 1820, the average garden supplied to the smallest cottages was about 350 square yards and to the larger cottages, for overmen, under managers, schoolmaster and other officials, about 700 square yards. In addition to these there were about sixteen acres of land for small allotments.

"Along with the gardening the Company developed a keen interest in the improvement of pasture land by draining and liming, making many experiments on the high level moors up to 2,000 feet above sea level, and from time to time the agents reported considerable success with this double treatment. This work was of great importance when they adopted the practice of building cottages with considerable enclosures of land and pasture, to form smallholdings."

In his evidence to the Select Committee for the Rating of Mines on the 9th June 1857⁸ Robert Bainbridge gave the following answers: —

340. You have spoken of the rates at Alston Moor. If I understand you correctly, according to the present arrangement, save and except what they get from your clubs, the whole poor are maintained entirely by the owners of the fee? —Yes, by the landowners.

341. And those owners and occupiers are not interested in these mines in any way? — Yes; they are most materially interested in them.

342. How? —It is the mines that have given value to the lands and houses; in the absence of the mines the lands would have been nothing better than sheep-walks; there would have been only a few shepherds upon them; there would have been no houses.

343. Is it good land there, or not? —Immediately in the neighbourhood of the river it is very good land, but away from the river it is poor land.

344. What description of land is it, arable or pasture? —It is grazing land.

345. How would those grazing lands depend on a mining population, because the amount paid for carriage, you say, is small? —The lands are chiefly occupied by the working miners; they occupy little farms, worth 10/. or 20/. a year, throughout the district. The chief of the lands are in the occupation of the miners.

346. Is it the fact that the occupiers of the land never complain at all of the burden of the poor-rates? —No, I cannot say they do. There is no doubt that there are individuals among them who would be very glad to be relieved from the burden, but I should say that the bulk of the owners and occupiers of land in those mining districts are so well satisfied that it is from the mines that the land chiefly takes its value, that they are quite content to let things remain as they are.

347. You do not hear of any complaints upon the subject from vestries, do you? —No.

348. What is the fair average number of poor, taking the agricultural and mining population together? —One can scarcely make a distinction, for the population is so mixed up, the farming with the mining population, that they are almost all as one; it is scarcely possible to go into a family occupying half an acre in Alston Moor or Teesdale, without finding that one or more members of that family are workmen employed in mines.

354. Are there no large landed proprietors in that district; is the land all in the hands of small tenants? —In Teesdale there are two or three; in Alston Moor I cannot name a large proprietor who is not, directly or indirectly, connected with the mines; in fact, many of those parties who are in possession of estates in Alston Moor are fortunate miners; miners who in past years have speculated and have been fortunate, and who have bought up little properties around them.

355. Then all parties who are the holders of land are so connected with mines in one way or another that this is almost an exceptional case to other districts, where parties have nothing to do with mines? —That is the case in Alston Moor. The whole of the residents in Alston Moor are, either directly or indirectly, taking them as a mass, connected with the mines; and the same observation applies to Teesdale.

367. Now, as to Teesdale. You have a variety of landowners there; the Duke of Cleveland, Mr. Hutchinson, and Mr. Bowes. Are there any others? — Yes, there are other parties who hold lands there.

368. Are they more or less concerned in the mines? —The bulk of them are connected with the mines, but not so closely as they are in Alston Moor.

369. But they are generally connected with the mines. The landowner may be unconnected with mines, but the bulk of his tenantry are, either in the shape of working under ground or in the carriage of ore; so that it is pretty nearly the same there as it is in Alston Moor? —Yes.

370. Almost all parties who have land are connected either directly or indirectly with the mines? —Yes.

371. And they are dependent in some measure upon them? —Yes. If the mines were not existing there would have to be an emigration en masse from the country, and we should very soon have depopulation.

372. Do you employ all the people there now who come to you; is there a scarcity of miners, or is there a redundancy? —There is a scarcity rather than otherwise; we have no difficulty in getting miners, but at the same time there is no want of employment in the country about us.

373. Are the farmers in your neighbourhood obliged to pay a higher rate of wages than is usually paid in the country, or not? —Yes.

374. Is that in consequence of your employment of the miners? —Yes; but still they are able to go on very comfortably; I hear no complaints.

375. The farmers do not complain of your taking away their men? —No; it is not an agricultural neighbourhood; there are comparatively few men employed upon the surface of the land; being a grazing country, the requirements of the people for working the land are comparatively small. Our miners are only obliged to work 40 hours in the week, and consequently, they have a great deal of time at their own disposal; and during that time many of them are in the employ of persons around, so that the owners and occupiers of land have no difficulty in finding labourers.

Thomas Sopwith also gave evidence to the Commission on 26th February 1857⁹:

79. Are the miners in your district occupied at all in the summer time above ground, as they are in Derbyshire? — They have nearly all a little farm; they have hay-farms, and they get their own hay: they have two or three weeks from the mines to get it, and some of them go down to the sea-side for a week or a fortnight.

80. Those farms upon which they get their own hay they pay poor-rates upon, I presume? —Yes, they pay poor-rates upon those farms.

81. Have you known the mining districts in that part of the country sufficiently long to be able to give the Committee an opinion as to the general operation of mining in that country, as regards the population, whether it has been, upon the whole, beneficial to the property in the district, and the population living upon it, or whether the latter has become a charge in sickness and otherwise upon the property? —There is no question that the value of land has been very greatly increased: the districts were not fit for sheep-walks, but merely for grouse shooting, intersected by valleys of cultivated land. The value of property has been increased very much indeed.

94. If I understood you correctly, you said that, taking the average of the whole parish, the population was about half miners and half agricultural? — I should say there would be rather more miners than otherwise.

95. Then I come to the conclusion, that the population of the northern part must be chiefly agricultural? —Yes, they are agricultural, and those depending upon the smelting; they are partly smelters and partly agriculturists.

166. You stated that the value of the property in the neighbourhood of the mines was increased by the mines; are you quite sure that the advance of science and of agricultural knowledge in the age in which we live, has had nothing to do with the increase of the value of the agricultural property, totally irrespective of the mines? —To a certain extent, but not materially, because it is not like a purely agricultural district, where many improvements are introduced; the farms are chiefly small grazing farms; there is scarcely any corn grown, and therefore it is really in consequence of the mining population which has been induced, that the land has acquired a value at all.

167. But although there is no corn grown, there is a great deal of what is called grassland, that is, pasturage for cattle? —A great deal.

As Robert Bainbridge correctly predicted the decline of the lead industry resulted in the depopulation of the lead mining districts it can be fairly said that the fortunes of the people of the Alston & Garrigill Districts, miners or otherwise were inextricably linked to the state of the lead industry. As the census reports show even those miners who possessed or rented land were forced to migrate, as the land they farmed was insufficient on its own to support a family.

The Health and Lifespan of the Mining Population

One of the most influential reports into the health of the population was Chadwicks report On The Sanitary Condition Of The Labouring Population of 1842¹⁰.

In the summary of his report Chadwick highlights the causes of the high mortality of the population and his recommendations: —

First, as to the extent and operation of the evils which are the subject of the inquiry: —

That the various forms of epidemic, endemic, and other disease caused, or aggravated, or propagated chiefly amongst the labouring classes by atmospheric impurities produced by decomposing animal and vegetable substances, by damp and filth, and close and overcrowded dwellings prevail amongst the population in every part of the kingdom, whether dwelling in separate houses, in rural villages, in small towns, in the larger towns—as they have been found to prevail in the lowest districts of the metropolis.

That such disease, wherever its attacks are frequent, is always found in connexion with the physical circumstances above specified, and that where those circumstances are removed by drainage, proper cleansing, better ventilation, and other means of diminishing atmospheric impurity, the frequency and intensity of such disease is abated; and where the removal of the noxious agencies appears to be complete, such disease almost entirely disappears.

That high prosperity in respect to employment and wages, and various and abundant food, have afforded to the labouring classes no exemptions from attacks of epidemic disease, which have been as frequent and as fatal in periods of commercial and manufacturing prosperity as in any others.

That the formation of all habits of cleanliness is obstructed by defective supplies of water.

That the annual loss of life from filth and bad ventilation are greater than the loss from death or wounds in any wars in which the country has been engaged in modern times.

Secondly. As to the means by which the present sanitary condition of the labouring classes may be improved: —

The primary and most important measures, and at the same time the most practicable, and within the recognized province of public administration, are drainage, the removal of all refuse of habitations, streets, and roads, and the improvement of the supplies of water.

That the chief obstacles to the immediate removal of decomposing refuse of towns and habitations have been the expense and annoyance of the hand labour and cartage requisite for the purpose.

That this expense may be reduced to one-twentieth or to one-thirtieth, or rendered inconsiderable, by the use of water and self-acting means of removal by improved and cheaper sewers and drains.

That refuse when thus held in suspension in water may be most cheaply and innoxiously conveyed to any distance out of towns, and also in the best form for productive use, and that the loss and injury by the pollution of natural streams may be avoided.

That for all these purposes, as well as for domestic use, better supplies of water are absolutely necessary.

That for successful and economical drainage the adoption of geological areas as the basis of operations is requisite.

That appropriate scientific arrangements for public drainage would afford important facilities for private land drainage, which is important for the health as well as sustenance of the labouring classes.

That the expense of public drainage, of supplies of water laid on in houses, and of means of improved cleansing would be a pecuniary gain, by diminishing the existing charges attendant on sickness and premature mortality.

That for the prevention of the disease occasioned by defective ventilation, and other causes of impurity in places of work and other places where large numbers are

assembled, and for the general promotion of the means necessary to prevent disease, that it would be good economy to appoint a district medical officer independent of private practice, and with the securities of special qualifications and responsibilities to initiate sanitary measures and reclaim the execution of the law.

That by the combinations of all these arrangements it is probable that the full ensurable period of life indicated by the Swedish tables; that is, an increase of 13 years at least, may be extended to the whole of the labouring classes.

That the attainment of these and the other collateral advantages of reducing existing charges and expenditure.

In order to look at how relevant Chadwick's comments are to the Alston, Garrigill & Nenthead district evidence will be sought from the various government reports of the time, with particular reference to housing & sanitation, diet, health and working environment.

Housing

In 1842 we have a reference in the Mitchell report to the housing of the lead miners¹¹:

"The houses of the miners are substantial and well whitewashed, but the furniture is nothing like so valuable as the furniture of the miner in the coal districts; the wages will not afford it."

Dr Peacock in his medical report dated August 1863¹², gives a more complete picture of the miners housing:

"Dr Carson obligingly took me to the cottages inhabited by the various classes of workmen at Nenthead.

"The cottages built by the company for the smelters are very good; they are pleasantly situated on one side of the valley with a bank sloping to the Nent, laid out as gardens. The cottages have two large and high rooms, are properly drained and have a yard behind, with a coal cellar, dustbin, and privy. The only objection is, that the rooms are only two in number, and this, for large families, is too few, and was complained of by some of the residents.

In a group of recently built miners' cottages, the company have so enlarged the dimensions as to admit of two rooms on the ground floor and two bedrooms above.

"There are other cottages not belonging to the company, which are defective, and some of them are most objectionable. A portion of these cottages are thatched, have only two small and low rooms, the upper in the slanting roof, and sometimes only reached by a ladder; there is no under drainage, sometimes no privy, and rarely any garden ground. One row was especially defective, the houses being divided across so that there was one tenement in front and another behind, and of course no thorough draught."

Robert W. Bainbridge the Superintendent of mines for the London Lead Company, at Alston & Teesdale, was asked whilst giving evidence for the Kinnaird report¹³ about the housing of the miners.

"16.338. (Mr. Austin Bruce.) Have you any objection to state what is the rent which they pay for those houses? — £3. 10s. and £4. a year.

"16.339. How many rooms are there in the houses? — Four rooms ; we charge £4. 10s. a year for four rooms and a garden.

"16.340. Of those rooms how many are sleeping rooms? Two of them; and then they generally make use of the kitchen also as a sleeping room.

"16.341. So as to make a division of the sexes of the children? — Yes; the father and mother generally sleep in the lower room, and the girls upstairs in one room, and the boys in another.

“16.342. Do many of the cottages belong to the workmen themselves? — Yes, many of them.

“16.343. Is that a common way of investing their savings? —Yes.

“16.344. (Mr. Holland.) Do they take lodgers? — Our rule with regard to the Company's houses is, that they shall not take lodgers; but I suppose that we find it needful to be blind occasionally.

“16.345. Then that rule is relaxed? — Yes.

“16.346. What relaxation do you allow? — I cannot say that we have any general rule. Supposing that there was a surplus of population over the house accommodation, then instead of going to the party and saying "You ought not to have lodgers," I should think it advisable to look over it.

“16,347- Is there often a surplus of population over the house accommodation? — Occasionally there is, but only occasionally.

“16,348. Then the overcrowding as regards lodgers is an exception, is it? — It is an exception to the general rule.”

In order to determine the level of occupation of the houses in Alston and Nenthead the census reports for the district of the Butts in Alston town, and enumeration district 7, Nenthead have been examined.

The Butts, Alston Town						
Year	Population	No's of Occupied Houses	Unoccupied Houses	Average Occupancy	Houses with 8 or more Occupants	Number of Households
1841	282	70	9	4.03	5	84
1851	398	81	1	4.91	13	90
1861	298	70	18	4.26	7	73
1871	246	59	15	4.17	6	63
1881	202	50	7	4.04	4	50
1891	140	35	10	4.00	2	35
1901	100	26	7	3.85	1	27

Nenthead Enumeration District 7						
Year	Population	No's of Occupied Houses	Unoccupied Houses	Average Occupancy	Houses with 8 or more Occupants	Number of Households
1841	796	154	8	5.17	26	173
1851	872	142	0	6.14	30	169
1861	892	178	1	5.01	20	189
1871	843	179	4	4.71	16	190
1881	666	145	8	4.59	21	154
1891	478	118	35	4.05	7	118
1901	506	126	8	4.02	8	126

From these tables we can see clearly that the average occupancy of the housing in the Butts was less than that at Nenthead, and that there was a greater degree of overcrowding at Nenthead in 1851 at Nenthead over 21% of the houses were

occupied by 8 or more individuals. In 1851 at Overwater, Nenthead 2 families and lodgers a total of 14 people were living in one house. At Hillersdon Terrace, Nenthead one house held a family of 13.

It is possible to compare the figures for the Butts and Nenthead with national, county and other parish data.

Average Occupancy of Houses				
Year	St Andrew's Parish Newcastle	Cumberland P.L.R.C.	Alston & Garrigill P.L.U.	England & Wales
1801	9.57	5.4	12	5.6
1811	7.24	5.5	11	5.6
1821	8.55	5.7	6.4	5.7
1831	8.13	5.5	5.3	5.6
1841	4.95	5.2	5.1	5.4
1851	7.62	5.3	5.4	5.5
1861	7.13	5.1	5	5.4
1871	7.12	5	4.7	5.3
1881	7.04	5.1	4.5	5.4
1891	7.52	5.1	4.2	5.3
1901	7.07	5.1	4.1	5.2
1911	No Data	5	4.2	5

This table clearly shows houses in the St Andrew's parish of Newcastle upon Tyne (the low figure in 1841 for St Andrew's was due to the rebuilding of the centre of Newcastle) would be far more crowded than those in Alston, Garrigill & Nenthead, and with the exception of 1851, Nenthead compared favourably with Cumberland and National figures.

In 1901 the percentage of the Alston with Garrigill parish living in overcrowded tenements was 8.07%, see below.

1901 Census Overcrowding in the Rural Districts						
	Population	No. of People Living In Overcrowded Tenements	Percentage of Population Living in Overcrowded Tenements	Total No. of Inhabited Tenements	No. of Overcrowded Tenements	Percentage of Overcrowded Tenements
Alston with Garrigill R.D.	3134	253	8.07	788	35	4.44

Source: "The Housing Problem in England" Ernest Ritson Dewsnup, M.A. 1907

Sanitation and Water Supply

Before the "The Public Health Act" (operative from 1875) the "Board of Guardians for the Parish of Alston & Garrigill were responsible for sanitation and public health. From 1875 this became the responsibility of Alston Rural Sanitary Authority. The 1894 Local Government Act renamed these authorities Rural District Councils. The Alston with Garrigill Poor Law Union was formed in 1837 and was overseen by a Board of thirteen Guardians.¹⁴ The 1834 Poor Law

Amendment Act laid the foundation for the provision of Medical Officers to be appointed by the Board of Guardians to look after the poor of the parish. These medical officers were initially part time posts offered for tender and given to the lowest bidder. This system proved unsatisfactory and following complaints made to the Select Committee of 1837 the unions appointed qualified doctors at appropriate wages.¹⁵ Following the Poor Law Commissioners Report of 1842, Unions were split into districts and a medical officer appointed to each one, the Alston with Garrigill Union was split into two districts.

In 1840 and 1841 two important Acts were passed extending the practice of vaccination, (1840, 3 and 4 Vic. cap 29; and 1841, 4 & 5 Vic., cap. 32) by these Acts the guardians of unions, were directed to contract with one or more legally qualified medical practitioners, "for the vaccination of all persons resident in such unions or parishes respectively." But it is to be a condition of every such contract, that the amount of remuneration "shall depend on the number of persons who, not having been previously successfully vaccinated, shall be successfully vaccinated by such medical practitioners respectively." The 1841 Act directed that the expenses of vaccination "...shall be defrayed out of the poor-rates, and that the vaccination, or medical assistance incidental thereto, shall not be considered as relief, nor deprive any one of any right or privilege, nor subject him to any disability or disqualification whatsoever.¹⁶" This was the first free medical service to be provided by the state.

It is estimated that in 1842 the number of children vaccinated was 378,331; and that in 1843 the number was 183,074. The payments for vaccination amounted in—

1841 to	£10,171
1842 to	£33,104
1843 to	£16,019 ¹⁷

The "Alston With Garrigill Board of Guardians Minutes (SPUA 1) held at Carlisle Archives give an insight into the work of the Guardians and the Medical Officers.

13th March 1841

"...that a circular had also been received relating to the mode of remuneration the medical officers and other matters connected with medical relief ordered that in answer to this communication from the Poor Law Commissioners a statement shall be made to them that in the opinion of this Board neither of the two Medical Districts of this Union are too large nor are capable of any improvement as to the Divisions or Boundaries thereof and that the proper mode of remuneration to the medical officers under the peculiar circumstances of this Union is the one at present in operation Viz. by fixed salaries without establishing a pauper list and that the yearly salaries of fourteen pounds and four pounds now payable to the present medical officers for the current year are considered by this Board as the fair and proper amount of remuneration to such officers."

23rd September 1843

"An account of six pounds one shilling having been presented by Mr Routledge Surgeon, for a quarters salary and extra cases of midwifery &c., and for 34 successful cases of vaccination ordered that the same shall be paid. Ordered also that an amount of £1 3s 6d the amount claimed by Mr Cason the other medical officer shall be paid.

"A communication having been received from the Poor Law Commissioners respecting paupers of unsound mind and recommending that such persons should receive the best

professional aid and at as early a stage as possible of their malady, ordered that the recommendation of the Commissioners shall be duly attended to."

The minutes of 25th October 1851 record that the Board of Guardians approved a weekly payment of 5s per week to be made to Jonathan Moffatt who had been blinded at Washington Chemical works, and was unable to provide for his family. In October 1853 the Guardians approved the payment of 5 guineas towards the cost of Jane Smith attending the "Asylum for the Blind" at Newcastle, they had paid a similar amount the previous year.

The 9th and 10th Victoria, cap. 96, for the removal of nuisances, was passed in 1846, it provided that the Board of Guardians, with the certificate or two qualified medical practitioners, "of the filthy and un-wholesome condition of any dwelling-house, or of the accumulation of any offensive or noxious matter, or of the existence of any foul or offensive drain, privy, or cesspool, shall cause the owner or occupier of the premises to be summoned before two justices of peace; and if the justices are satisfied of the existence of the nuisance, they are to make an order for cleansing whitewashing or purifying such dwelling-house, or the removal of such nuisance ; failing in which the guardians may cause the premises to be cleansed and the nuisances to be abated, the cost of doing which may be recovered from the owner or occupier, unless the same be for special reasons excused; and if not so recovered, the expenses are to be defrayed out of the poor-rates of the parish in which they were incurred." This Act was amended two years afterwards by the 11th and 12th Victoria, cap. 123, and again in the following year by the 12th and 13th Victoria, cap. 111, the powers above given for the removal of nuisances being increased, and more fully described. The surveyors of highways were directed "to scour, cleanse, and keep clear all open ditches, gutters, drains, and watercourses adjoining thereto;" and "any person who suffers the drainage of soil or offensive matter from any new building into an open ditch, is declared to be guilty of a misdemeanour."

The Board of Guardians minutes of 3rd December 1853, record their receiving a complaint regarding a "nuisance"

"A document addressed to the Board of Guardians signed by several Householders at Physic Hall Bank Foot, complaining of a cess pool near their dwellings arising or occasioned by the overflowing and back water of the mill burn. Ordered that the clerk should write to Mr Paull as representative of the Lords of the Manor and also Robert Nattrass as tenant of the Mill and Fair Hill ground requesting steps to be taken to effectually remove the nuisance complained of."

The minutes of the 5th May 1855 give further detail regarding the appointment of Medical Officers.

"In accordance with the instructions given at the last meeting the Clerk wrote to the Poor Law Board informing them of the Contract made with Mr Carson as Medical Officer for No. 2 or High District of this Parish and at this meeting read the Boards reply to his letter. The Clerk has also informed the Poor Law Board of Mr Routledge's resignation as Medical Officer of the Alston Low District and that his successor would be appointed at the meeting to be held this day.

"In consequence of the notice given for the appointment at this meeting of a successor to Mr Routledge as Medical Officer of the Alston or Low District of this parish, Mr Charles Arnison offered himself as a candidate on the same conditions as Mr Routledge has held the office, and Mr Arnison's appointment having been proposed by Mr Hugh Watson Friend, seconded by Mr Jonathan Walton and sanctioned and approved by the Guardians

present. Ordered that Mr Arnison enter on the duties of Medical Officer of the Alston Low District on Mr Routledge's removal in the course of next week, and that the Clerk inform the Poor Law Board of the appointment and request their sanction to the same; also that he prepare the usual contract for the current year ending March 25, 1856 to be executed by the Guardians and Mr Arnison at the next meeting of Guardians on the 19th May. Salary reckoning from March 25th last to March 25, 1856, fourteen pounds Viz., £10 for the workhouse and £4 for the account of the District.

"Ordered that the Clerk inform the Poor Law Board that there are no Medical Gentlemen residing in the Parish of Alston with Garrigill that possess the qualifications named under Article 167 of the Order of the 8th December 1847, but that Mr Arnison has had a diploma as Licentiate of the Society of Apothecaries since 1834 and has practised in this town and neighbourhood for the last thirteen years."

The requirement that the Poor Law Board wanted was that the Medical Officer should have both Medical and surgical qualifications.

The problems relating to sanitation and 'nuisances' continued, in the minutes of 8th November 1873, a complaint had been made of filth behind the Grammar school in Alston by persons unknown, the Guardians ordered "...that the clerk do issue a hand bill cautioning all persons against disposing of night soil, ashes or other filth in the streets or public places in Alston or other parts of the parish."

On the 4th July 1874 following the report of the Medical Officer for Nenthead and Garrigill (District 2) the Guardians ordered "...that a printed notice be issued respecting the owners of houses to provide requisite Ash pits and Privy accommodation for the use of their tenants."

The Hexham Herald reported the meetings of the Rural Sanitary Authority which give information relating to the state of sanitation and the health of the population.

8th May 1875

Alston Rural Sanitary Authority

... It appeared that the deaths in No. 2 district for the year ending December 31st 1874, were from all causes 61, few were from zymotic disease, but those from disease of the respiratory organs especially children and aged persons were more numerous than usual. This was attributed to the severe weather we had experienced. ... Dr Carson's report was also read: - There had been a case of Typhoid fever at Nenthead and he had seen that the place was disinfected. There were also five cases of Scarlet Fever in the Garrigill district, chiefly Ashgill; the sanitary arrangements were defective and he had ordered the sewers to be flushed and a drain directed a little from one of the houses.

25th December 1875

Alston Sanitary Authority

The clerk read Dr Carson's report for No. 2 district:

Since my last report I have visited Rotherup Side and found all in good sanitary condition with the exception of the premises occupied by Isaac Varty and Hugh Kearton, belonging to T. Horrocks Esq. The dung heaps are too near the dwellings and turnpike road, recommend the above to be removed to a greater distance. ... Garrigill Gate is in a good sanitary condition and all recommendations carried out with the exception of the joint premises of Thomas Watson and Adam Pickering. Visited Nenthead on the 29th October and found one privy at Holmesfoot used by the tenants of John Lattimer and Pearson in a bad condition, also two at West Nenthead used by the tenants of Joseph Blacklock, recommended the occupiers to join in keeping them clear. On visiting them on the 13th December found my advice carried out. At the same time inspected Joseph Teasdale's premises at Holmesfoot, found privy in a bad state, promises to have it cleared out when

the snow disappears. I am happy to say that the district is free from all epidemics at present.

5th February 1876

Alston Sanitary Authority

Dr Carson submitted the report for the No. 2 district for the year ending 31st December 1875, and stated that the district was never in a more healthy condition than at present. At the beginning of the year Scarlet fever was very prevalent at Ashgill and Nenthead, but owing to the great care exercised it did not spread. Two or three isolated cases occurred during the summer. With the exception of the above and a few cases of Typhoid fever the district has been free of epidemics. .. Since last report I visited Wellgill and found no privy accommodation although there are 6 or 7 families in the locality but in other respects satisfactory. At the same time I inspected Newhall and found the premises occupied by Mr J. Jackson and belonging to G. Wilson Esq. in a bad state owing to the large collection of stagnant liquid manure surrounding the dung heap. Recommended its removal to a greater distance from the house. The number of deaths in the district for the year amounted to 54 being at the rate of 17.4 per thousand, consisting of 25 males and 28 females.

27th April 1878

Alston Rural Sanitation Authority

The Inspector reported a fatal case of Typhoid fever at Beldry, near Garrigill. Every precaution had been taken to prevent the spread of the disease. No fault was to be found with the sanitary arrangements. The Medical Officer had visited the place and did not attribute the death to defective sanitary conditions.

12th October 1878

Rural Sanitary Authority.

The quarterly report of Dr Carson, Medical Officer of No. 2 district was read. The district was generally healthy and there was no epidemic disease. There had been a case of Typhoid fever at Silly Hole, but precautions had been taken to prevent its spread. The inhabitants of Hillersdon Terrace, Nenthead, were in the habit of placing ashes and other refuse against the walls of their houses, the heaps were unsightly, and might be obnoxious to health. He recommended that they be removed oftener. Mr J. J. Millican said the Lead Company removed their heaps once a week.

18th January 1879

Alston Rural Sanitary Authority.

The annual report of Dr Carson, Medical Officer for the No. 2 district was read. Whooping cough had been prevalent in the early part of the year, five cases proving fatal. Two cases of Typhoid fever had occurred at Garrigill, no other epidemic was prevalent. Fifty-two deaths had occurred in the district during the year or at the rate of 17 per thousand, an increase of 2.3 over last year.

26th April 1879

Alston Rural Sanitary Authority

The quarterly report of Dr Carson, Medical Officer No. 2 district (Garrigill and Nenthead) was read. Five cases of Scarlatina had occurred at Tynehead. The houses had been thoroughly disinfected. Diarrhoea was prevalent in the district.

14th February 1880

Alston Rural Sanitary Authority

The Medical Officers report (Dr Carson) for No. 2 district was read: He had inspected the district periodically and found nothing seriously detrimental to health. There had been five cases of Scarlatina at Dykeheads, and effective steps had been taken to prevent spreading. There had been a fatal case of Enteric Fever at Mr Hugh Kearton's,

Rodderupside. The premises were in good condition except that the manurestead was too near the door and the road. This was also the case at the adjoining premises occupied by Mrs Varty.

12th February 1881

Alston Rural Sanitary Authority

The clerk read the Medical Officers report of No. 2 district. He reported having found the district in a satisfactory sanitary condition. Measles had been epidemic at Nenthead and on death had resulted from them. There had been a few cases of fever in a mild form. During the quarter, there had been 65 births and 39 deaths.

8th April 1893

Alston Rural Sanitary Authority

Dr Short's annual report for No. 2 district showed 47 births and 29 deaths or at the respective rates of 28.05 and 16.7 per 1000. Of the deaths 72 per cent were infants or persons over 65 years of age. Of the deaths two were due to Whooping Cough, two to Influenza, and three to Phthisis. The adoption of The Contagious Diseases Notification Act was strongly recommended. In view of a possible visitation of Cholera, the district had been carefully inspected and faulty drains and middensteads put in order. At Hillersdon, the water supply was defective and he hoped rapid progress would be made with laying the new pipes.

17th October 1896

Alston Rural District Council

Medical Officers report for No. 2 district. The health and sanitary conditions of No. 2 district continues satisfactory, I do not think there has ever been so little sickness prevalent as the quarter that has now passed. ... A few cases of diarrhoea of a very mild form have occurred. The total number of deaths and of births is the same. So that the average birth and death rate for the quarter is 3.58 per 1000. The Sanitary Inspector reported 5 dwelling houses and a lodging house at Overwater without privy accommodation and ash pits, in consequence of which there existed a nuisance in a field adjoining part of which is upon a drain where the water passes to supply water to Overwater. It was ordered that notices be served on the owners to provide proper accommodation.

In 1808 a fresh water supply was piped to Alston at a cost of £200.16s.8d., raised by public subscription. This water supply ran from a spring on Broadpot Hill, on the Nenthead Road, to four standpipes; one at Town Foot, one at the future site of the Town Hall, another at the Market Cross, and one at Back o' the Burn, the area around the Butts did not receive its water supply until later¹⁸.

The first meeting of Alston with Garrigill Rural District Council was held on 24th December 1894, and in November 1898 it invoked the Public Health Act of 1875, Section 39, which gave, "powers to provide public necessities " (toilets). Two years later, it was reported that the waterworks, including those in the Butts, were "proceeding"¹⁹.

In 1890 the source of Alston's water supply was a large water tank at Town Head which supplied seven standpipes. Council records from the late 1890s and early 1900s describe the laying of new water and sewage mains, to which residents were obliged to apply for connection. 'Public ash pits' and a 'urinal' followed as part of this process²⁰.

At Nenthead the Lead Company provided a water supply in 1850, and a public washhouse was built in 1865. It appears that a drainage system was also in place as the Minutes of the Rural Sanitary Board of 25th July 1891 show.

"The Inspector of Nuisances having reported that a certain drain passing through certain houses at Nenthead was out of repair and in a condition prejudicial to health; ordered that a new pipe sewer be constructed and made to pass outside the said houses."²¹

In November 1893²² Dr Masterton reported that the water supply at Nenthead was "constantly free since Gilligill Burn pipes were laid, but a supply was still wanted at Hillersdon."

In January 1896 the Rural District Council received a petition asking that a supply of water be carried from Nenthead to Holmesfoot. At the meeting of the Council Mr Lattimer said, "he lived in the locality and the need was urgent. He had himself gone to the present source of supply, an old mine, on the previous night. It took him ten minutes to go and return and nine minutes to fill his flagon.

"The water too was very "heavy" and not suitable for drinking. He moved that the inspector be instructed to report to the next meeting. Mr Bolton seconded the motion stating that the mine was the only source of supply for 20 houses."

In January 1896²³ it was reported to the Rural District Council that "the work in connection with the Nenthead water supply had been completed", at the same meeting it was decided to "proceed with the water supply work in Kate's Lane as soon as contractors could be found."

The Carlisle Journal of 7th July 1848 records the 'Watering and Draining' of Garrigill.

"A splendid silver lever watch, with gold appendages, was presented, on the 16th ult., to Mr Joseph Walton, mining agent, Garrigill, as a testimony of esteem for his efficient services in draining and watering the villages of Garrigill. Several gentlemen partook of tea on the occasion. Mr W. Paul was called to the chair; and W. Gray, on behalf of the inhabitants, presented the testimonial. Appropriate speeches were delivered by the Rev. J. Harper, of Alston, and Messrs J. Walton, J. Irving, R. Dent, and W. Gill of Garrigill."

The report below is from the Hexham Courant, of 30th October 1886.

Alston Rural Sanitary Authority.

The Medical Officers report of No. 2 district for the quarter ending 30th September was read. 22 births and 9 deaths have been registered. Of the births, 15 were males and 7 females and of the deaths, 3 were males and 6 were females. On the estimated population of 2333, 9 deaths give a death rate of 15.42 per 1000 per annum. Ages at death, 3 were under one year, 1 was 5 and under 15 years, one was 15 and under 25, three were 25 and under 60, one was 60 and under 70. Causes of death, 3 died in infancy from debility, one from Scarlet Fever, one from Heart Disease and dropsy, three from disease of the lungs, and one from disease of the nervous system. During the quarter Scarlet Fever occurred in 6 houses, and in these there were 23 cases. One case, that of a girl of 7 proved fatal on the 5th day, the fever being of a more malignant type than has prevailed during the epidemic. The other cases made good recovery. No fresh case has occurred during the past six weeks, the district at present being entirely clear. Recently an epidemic of catarrh, bronchial, and intestinal disorders has prevailed extensively among the inhabitants of the Nenthead district. The bronchial variety has told most severely on the health of the youngest children, and although there have been no fatal cases, yet several of them have come through a very critical illness. Intestinal catarrh has also been very prevalent both among children and adults, diarrhoea being the result. I think it is worthy of note that last year there was an entire absence of autumnal diarrhoea in this district while this year it has been the reverse. Its prevalence during the present autumn, along with the catarrh epidemic is no doubt attributed to injurious

atmospheric influences. Two cases of Typhoid fever were reported from Garrigill, both in men whose occupation lies in Harwood where several cases of this fever have occurred presumably from drinking impure water. There has been no further spread of this disease. My attention was directed to the fact that the flushing of the main sewer in Garrigill has been much neglected during the summer. I went over the watercourse with the Lead Company's agent and ascertained this to be the case, the reason being an objection to the water supply having its course through a certain field. I understand this matter has already been dealt with by the Authority, but as it is of the utmost importance for the health's sake, that all sewage and excreta should be got rid of, I may here be allowed to urge the necessity of having the regular flushing of the main strictly enforced. The Inspector of Nuisances and myself made the usual visit of the district and found the sanitary state of the district satisfactory. John Masterton.

In February 1890 the Medical Officers²⁴ report for District No. 2 concluded by stating that "good sanitary work had been done in connection with the main sewer in Garrigill by the insertion of suitable traps for its better ventilation and also that a purer water supply had been given to the village.

Diet

Frederick Hall writing in 1818 gives a description of the diet of the mining population during that time in his pamphlet "An Appeal to the Poor Miner"²⁵

"During these latter years, when the Price of Lead has been so low, and the Price of Provisions so high Families have, lived on Oatmeal and Water far Weeks together in some instances that Water not even boiled, the Parties being unable to procure Fuel to boil a Pot; and frequently their scanty and miserable Meal not seasoned by even a little Salt."

He goes on to describe "Crowdy".

"Oatmeal and Water form what in Scotland is called "Crowdy" or "Hasty Pudding" a healthy and good Meal, when seasoned with Butter, Bacon, Milk, or Beer, &c. but is in truth a sad Potage when nothing but cold Water can be added to it."

The great distress suffered in many mining communities, which Frederick Hall referred to, was not so great for the miners employed by the Beaumont Company and the London Lead Company, as both helped their workers by supplying grain. The London Lead Company also bought a mill at Garrigill, which was converted into a corn mill, to better supply their workforce with flour at a fair price. The mill and the ready money shop were not restricted to the miners but open to the whole community so benefiting everyone.

The tables showing average age of death for Alston and Nenthead (pg. 54 & 58) show the average age at death falling during periods of poor harvest.

The 1842 Commission²⁶, makes little reference to diet other than to say:

"As to the diet it will appear from the evidence of the witnesses, that it consists much more of vegetable food than amongst the miners of coal districts. Beer is not nearly so much drunk."

Mitchell when talking about the equipment in the mine shops refers to a tea kettle, pan for boiling potatoes and two pans for frying bacon, he also stated that many miners had a cow which yielded milk, butter and cheese. Further information can be gathered by looking at the evidence gathered by Mitchell²⁷.

Joseph Langstaff a miner aged 44:

"A great many miners have oatmeal crowdy to breakfast, which is cheaper than bread. Men who have no cow have no milk to the crowdy, they have only a bit of sugar or a bit of butter." "A miner in general does not eat so much as a man working in the open air; the foul air takes away the appetite"

John Emerson a miner:

"We can work at the lead mines with less food, and food of inferior sort from what is required in the coal mines; it is canny work rather than hard; our mines do not excite an appetite like the coal mines."

"The houses of the miners in Weardale are not furnished at all to compare with the furniture of the houses of the coal-miners; some lead-miners may have such furniture, but very few. We do not eat so good victuals, nor near so much, nor do we drink so much beer, because we cannot afford to do those things.

The miner's breakfast is usually crowdy of oatmeal. He takes a bait with him to the mine, bread, perhaps a little bacon, sometimes a little coffee, or some milk; he takes his bait about 11 or 12; he comes home at four or five, and gets a few potatoes and a bit of salt bacon; some take a little supper, and some not; he is in bed soon after nine, and rises between five and six.

"The young boys live in the same way and keep the same hours; boys have a better appetite than the men, and take crowdy twice a-day; they may get a little milk or beer to their crowdy; the miners have very little fresh meat; there is very little beer drunk; some are heavy drinkers, but the greater part seldom have any.

The London Company, in 1839 and 1840, imported a great deal of rye-com, and had it ground and sold to the workpeople. The bread did not agree with many, and those who could possibly do without it gave it to the pigs; the medical men disapproved of it as food."

Joseph Fleming washer aged 14.

I get up at six in the morning and take some coffee and bread; seldom anything to the bread. ... I have a little white cake and some coffee in a bottle for bait ... I come home and put on clothes; ...after washing we have supper a few potatoes and a bit of mutton, whiles bacon; ..."

Matthew Dowson a washer aged 16:

"I have worked at Shaunbury, and lodged in one of the shops, the lower shop, 21 of us slept in the same room. There were 12 bedsteads. There was a bad smell.

I went on Monday morning, and took with me bread, white and brown, potatoes, bacon collop half a pound, coffee an ounce and sugar half a pound and that supplied me till Saturday at twelve. I took with me on Monday three pints of milk and we kept it up the level a little to preserve it sweet. We worked 12 hours a-day, being over-time to make up for getting away on Saturday."

Joseph Walton mine agent, Alston.

"The miners derive great benefit by holding a few acres and keeping a cow or two, or so to supply them with milk, butter and cheese."

William Salkeld a miner aged 17:

"I get up between five and six o'clock. I have oatmeal pottage to breakfast. I have milk with them. I take with me to the pit milk and brown bread and white bread, the brown bread is made of rye. It is very black but not so black as your hat. It tastes pretty well. Sometimes the bad air takes away the stomach and we cannot eat. I take this all the year round. When we come home we get boiled potatoes and sometimes butter and sometimes a piece of bacon. We have rather a better dinner on Sundays and have some meat to it. I never drink beer, because I cannot get it."

William Whitfield a washer aged 12:

I get crowdie and milk to breakfast. I get tatoes to dinner and salt, sometimes butter. I take tea for supper and eat bread with it. I drink beer sometimes. I get a sup when I can I like it."

Joseph Eddy a miner, Greenside.

"Men who go to the lodging-shops take with them on Monday from a quarter to half a stone of bread, few more than a quarter of a stone; one pound of bacon; some a quarter, some half a pound of sugar, two ounces of coffee and oatmeal to make crowdie in the morning and sometimes in the evening and a few potatoes. Some take no bacon at all.

"One man who worked along with me lived for three years on oatmeal and water and never had anything else, unless the other men gave him bread. He had 9s. a-week and had a wife and family to support."

In 1864 in his report for the Kinnaird Commission Dr Thomas Peacock made the following point:²⁸

"The miners in the North are certainly a more robust race; and it is probable, upon the whole, their diet is more nutritious than that of the Cornish men. Many of them, at least in some districts, as in Weardale, Nenthead, &c, are small farmers; they have plots of ground sufficient to keep a cow, and thus they are able to obtain milk, and probably altogether more fresh animal food than the Cornish miners ordinarily have."

		BREAKFAST		DINNER								SUPPER			
		Porridge	Milk	Cooked Meat	Cooked Bacon	Portion of other Vegetables	Broth	Bread	Barley and Milk	Suet Pudding	Potato Soup	Porridge	Milk	Broth	Bread
		pint	pint	oz.	oz.	lb.	pint	oz.	pint	oz.	pint	pint	pint	pint	oz.
Sunday	Men	1	2/3	—	—	—	—	—	—	14	—	1	2/3	—	—
	Women	2/3	1/2	—	—	—	—	—	—	12	—	2/3	1/2	—	—
Monday	Men	1	2/3	4	—	1	1/2	4	—	—	—			1	6
	Women	2/3	1/2	3	—	1	1/2	3	—	—	—			1	5
Tuesday	Men	1	2/3	—	—	—	—	6	1	—	—	1	2/3	—	—
	Women	2/3	1/2	—	—	—	—	5	1	—	—	2/3	1/2	—	—
Wednesday	Men	1	2/3	—	3	1	—	4	—	—	—	1	2/3	—	—
	Women	2/3	1/2	—	3	1	—	3	—	—	—	2/3	1/2	—	—
Thursday	Men	1	2/3	4	—	1	1/2	4	—	—	—	—	—	1	6
	Women	2/3	1/2	3	—	1	1/2	3	—	—	—	—	—	1	5
Friday	Men	1	2/3	—	—	—	—	3	—	—	1 1/2	1	2/3	—	—
	Women	2/3	1/2	—	—	—	—	2	—	—	1 1/2	2/3	1/2	—	—
Saturday	Men	1	2/3	—	—	—	—	3	—	—	1 1/2	1	2/3	—	—
	Women	2/3	1/2	—	—	—	—	2	—	—	1 1/2	2/3	1/2	—	—

Workhouse Diet June 1842 in the Minute book of the Alston with Garrigill Board of Guardians (Carlisle Archives)

The workhouse diet above lacks variation but shows what was common food for the working people, as described by the miners above, and recent evidence suggests that such diets were a lot more healthy than we at first glance may have expected, assuming the inmates received the quantities described.²⁹

Illness & Disease

For a short period 1799 to 1807 the Allendale burial records show the cause of death of those buried, although the information is very limited it does show a tendency for miners to suffer more from pulmonary disorders than other occupations.

Allendale Burials June 1799 to August 1807			
Cause of Death	All Females	All Males	Total
Asthma	1	2	3
Cancer in the Throat	1		1
Consumption	18	22	40
Convulsion	2	1	3
Decay of Blood	1		1
Decline	5	5	10
Dropsy	2	3	5
Drowned consequence of Lunacy		1	1
Effects of Cold		1	1
Fever	2	1	3
Immature Birth	1		1
Inflammation		2	2
Inflammation in inside	1		1
Inflammation of the Bowels	7	11	18
Inflammation of the lungs	3		3
Internal Decay		1	1
Killed in the mine		1	1
Mortification		1	1
Natural imperfections		1	1
Old Age/Natural Decay	34	29	63
Palsy		1	1
Paralytic		2	2
Paralytic Stroke	1		1
Paroxysm		1	1
Rheumatic Fever		1	1
Pleurisy		5	5
Premature Birth	1		1
Quincy	1		1
Scald		1	1
Scarlet Fever	1		1
Scrofula		2	2
Stomach Complaint	1	1	2
Sudden Death		2	2
Typhus Fever	1		1
Whooping Cough	1		1
Grand Total	85	98	183

Allendale Burials		Occupation											
June 1799 to August 1807		Farmer/ Yeomen	Merchant	Miner	Smelter	Labourer	Mason	School master	Shoemaker	Tailor	Pauper	Others	Totals
Asthma				2									2
Consumption	3			3	1			1	1	1	3	3	16
Decline				1			1						2
Dropsy								1				1	2
Drowned consequence of Lunacy												1	1
Effects of Cold	1												1
Inflammation	1												1
Inflammation of the Bowels	1											1	2
Internal Decay				1									1
Killed in Mine				1									1
Mortification				1									1
Old Age/Natural Decay	5	2	2	2	1	3	1	1	2	2	6	1	26
Palsy				1							1		1
Paralytic	1												2
Rheumatic Fever				1									1
Pleurisy	1			4									5
Scrofula							1						1
Stomach Complaint												1	1
Sudden Death											1	1	2
%	18.84	2.90	24.64	2.90	4.35	4.35	4.35	4.35	4.35	4.35	15.94	13.04	

The Census reports give considerable data regarding disease and illness, below is a summary of the data for 1851 - 1860 and 1871 - 1880.³⁰

1 Jan 1851-31st Dec 1860	Alston P.L.U.	Newcastle upon Tyne P.L.R.D.	Cumberland P.L.R.C.
Cause of Death (RG 1850s DS definition)	Percentage	Percentage	Percentage
Small-pox	0.34%	0.66%	0.48%
Measles	0.00%	0.01%	0.06%
Scarlatina	0.34%	0.29%	0.78%
Diphtheria	0.00%	0.03%	0.11%
Whooping-cough	0.00%	0.00%	0.00%
Typhus	3.39%	5.20%	4.68%
Cholera, Diarrh. & Dysentery	1.36%	11.98%	2.04%
Other Zymotic Dis.	2.37%	2.40%	3.26%
Cancer	0.85%	2.79%	2.90%
Scrofula, Tabes Mesenterica.	1.69%	0.96%	0.96%
Phthisis	28.81%	25.95%	31.77%
Hydrocephalus	0.34%	0.00%	0.23%
Diseases of Brain	8.64%	7.77%	8.18%
Heart Dis. & Dropsy	8.64%	9.85%	10.02%
Dis. of Lungs	24.07%	10.48%	8.82%
Dis. of Stomach & Liver	9.15%	6.81%	7.62%
Dis. of Kidneys	1.53%	1.73%	1.61%
Dis. of Gener. Organs	1.02%	0.60%	0.62%
Dis. of the Joints	0.85%	0.66%	0.71%
Dis. of the Skin	0.17%	0.14%	0.18%
Childbirth & Metria	1.36%	1.86%	2.33%
Violent Deaths	3.39%	6.25%	6.41%
Other Causes	1.69%	3.59%	6.24%

01 Jan 1871 to 31 Dec 1880	Alston P.L.U.	Newcastle upon Tyne P.L.R.D.	Cumberland P.L.R.C.
Cause of Death (RG 1870s DS definition)	Percentage	Percentage	Percentage
Small-pox	0.23%	2.72%	1.78%
Measles	0.00%	0.00%	0.07%
Scarlet Fever	0.00%	0.33%	0.61%
Diphtheria	0.46%	0.12%	0.12%
Whooping-cough	0.00%	0.00%	0.00%
Typhus	0.23%	1.16%	1.45%
Enteric Fever	1.14%	2.20%	2.27%
Simple Continued Fever	0.23%	0.32%	0.39%
Puerperal Fever	0.46%	0.97%	1.36%
Diarrhoea & Dysentery	0.46%	1.24%	0.82%
Cholera	0.00%	0.14%	0.11%
Cancer	4.12%	3.91%	4.25%
Scrofula	0.92%	0.38%	0.40%
Tabes Mesenterica	0.23%	0.23%	0.31%
Phthisis	27.46%	24.70%	25.41%
Hydrocephalus	0.00%	0.11%	0.24%
Diseases of Nervous System	7.78%	10.81%	9.74%
Diseases of Circulatory System	5.72%	11.40%	10.79%
Diseases of Respiratory System	20.59%	12.28%	12.33%
Diseases of Digestive System	9.61%	7.27%	7.28%
Diseases of Urinary System	2.29%	2.55%	2.89%
Diseases of Generative System	0.23%	0.73%	0.48%
Childbirth	1.14%	1.30%	1.28%
Suicide	0.23%	0.73%	0.99%
Other Violence	3.89%	7.01%	6.62%
Other Causes	12.59%	7.37%	8.01%

What is immediately apparent is that although the Alston District did suffer from infectious diseases these were a less common than in Newcastle and Cumberland, whereas lung/respiratory disease was a lot more common in Alston.

Pulmonary Disease

Bernardo Ramazzini³¹ an Italian Physician identified in 1700 that miners suffered specific diseases particularly relating to the respiratory system.

“Now, the diseases which Metal-diggers and other such artificers are liable to, are for the most part a Difficulty of Breathing, Phthisic, Apoplexy, Palsy, Cachexy, Swellings of the Feet, Falling of the Teeth, Ulcers in the Gums, Pains and Tremblings in the Joints; so that upon the Whole their Lungs and Brain are affected; but especially their Lungs which Suck in the mineral Spirits along with the Air, and so receive the first injury ... Hence it is that those who dig Minerals in the Mines are but short-lived; and the Women who marry them have the opportunity of matching with several husbands”

“Sennertus, in his book of the Consent and Dissent of the Chymists with the Galenists, tells us upon the the Authority of a Physician, who practised near the Mines of Mysnia in Germany, That, in the dissected Corps of the Workmen, they found the very Metal they had been employed to dig.”

Ramazzini went on to describe preventative measures:

“The imprisoned Air of the Mines being tainted and polluted, partly by the Steams of the mineral Matter and of the Workmen’s Bodies, and partly by the Fumes of Lights that are kept under Ground, the Overseers of Mines use to draw out the gross and Stagnating Air, and let in such as is more pure and fresh, by some Wind-machines communicating with the Bottom of the Mines through Passages under Ground. They also generally guard the Hands and Legs of the Workmen with Gloves and Boots, to prevent their being infected.”

He went on to describe how the Ancients “used to have loose Bladders upon their Mouths, to keep out the pernicious Air; and these Bladders were so contrived, that they could see through them.” And that “at present, especially in the Arsenic-mines, we use Glass-vizards, which is a safer and neater Contrivance.

It is unfortunate that for so many years his suggestions were never taken up.

Edward Headlam Greenhow in his report of 1858³² looked in detail at the incidence of Pulmonary disease.

Population in 1851.	Name of District.	Pulmonary Death-rates.		Persons per Square Mile.	Percentage of Urban Population.
		Male per 100,000.	Female per 100,000.		
258,236	Liverpool	1,062	939	74,416	100
6,816	Alston	877	494	125	29
173,951	Birmingham	833	699	41,853	100
53,628	Redruth	670	450	852	25
50,670	Hull	589	525	17,750	100
123,860	Huddersfield	550	550	1,191	25
37,386	Stroud	511	511	547	23
64,248	Tynemouth	507	506	1,035	45

With reference to the table above he observes that “in several of these towns the male death rate from pulmonary disease very much exceeds that of the females; in

others the male and female death rates are equal.” In the case of Alston the male death rate from pulmonary disease is nearly double that of the females which strongly suggests that the cause is occupational.

He goes on to look specifically at lead mining and in table 30 (below) he gives details of some lead mining areas.

About lead mining he said “This kind of mining appears to be very injurious to health. The difference of pulmonary death rate in the sexes are well marked, and correspond pretty nearly to the proportion of men engaged in mining.

The male death rate from pulmonary affections is considerably higher than the female in each of the six districts shown in the table, and the excess is greatest in the purely lead mining districts of Reeth and Alston.”

Name of District.	Death-rate from Pulmonary Affections.		Percentage of Adult Men engaged in		Urban Percentage of Population.	Persons to a Square Mile.
	Male per 100,000	Female per 100,000	Agriculture	Lead Mining		
Aberystwrith	491	429	33	17.8	22	115
Pateley Bridge	508	391	46.5	9.5	0	72
Weardale	532	497	15.9	32.4	0	103
Holywell	552	501	22.4	14.6	22	294
Reeth	724	528	19	49.6	0	62
Alston	877	494	8.2	58.8	29	125
England and Wales	569	535	26.5	—	50	307

Pateley Bridge. 15.5% of the adult men and 8.5% of the adult women are employed in the manufacture of flax.

Weardale. 6.6% of the adult men are employed in coal mining, and 8.2% in iron mining and manufacture.

Holywell. 11.3% of the adult men are employed in coal mining.

England & Wales. 4.4% of the adult men are employed in the several kinds of mining and quarrying.

In table 31 Greenhow³³ compares the death rates of those under 5 years, and those above 20 years.

Name of District.	Death-rate from Pulmonary Affections.					
	All Ages	All Ages	Under 5 Years		Above 20 Years	
	Male per 100,000	Female per 100,000	Male per 100,000	Female per 100,000	Male per 100,000	Female per 100,000
Haltwhistle	328	399	448	207	374	429
Alston	877	494	561	324	1,440	391
Reeth	724	528	633	558	1,298	497
Liverpool	1062	939	3,092	2,364	1,044	759

He comments on the table as follows:

“The mortality of children during the first five years of life from all causes in Alston and Reeth is rather, but not a great deal, higher than prevails in Haltwhistle, but the mortality from pulmonary diseases is much higher. When, however, the mortality of children in the city of Liverpool is contrasted with the mortality of children in Alston and Reeth, it is found that, although the pulmonary death-loss in the two lead-mining districts is considerably higher than that which is sustained by the healthy agricultural district, it is immensely below that which is sustained by the infantile population of the great unhealthy city. This advantage enjoyed by the younger inhabitants of the lead-mining districts over those of Liverpool is altogether lost in more advanced life. The women of Liverpool perish from chest affections in a rather larger proportion than those of Reeth; in a slightly lower proportion than the women of Alston; but the men of Alston and Reeth die in a much larger proportion than the men of Liverpool. Thus a district remote from city influences, situated in the midst of a most salubrious district, and containing scarcely an appreciable urban character, (since although 29 per cent, of the inhabitants of Alston reside in the town that gives name to the district, the town only contained 2,005 inhabitants in 1851.) loses a larger annual proportion of its adult male inhabitants from diseases of the chest than the unhealthiest city in the kingdom. That this is due to the nature of the prevalent employment no doubt can now be entertained. It is the injurious character of the male occupation, which causes Alston, the most exclusively lead-mining district in England, to be the place in which there is a larger proportion of widows than in any other place in the kingdom. (The 1851 census shows 21.4% of the women of Alston are widows) Alston has been a lead-mining district for many centuries, and the inhabitants have probably acquired some of those peculiarities of physical character to which the term race may properly be applied. Amongst these peculiarities, a tendency to pulmonary diseases must probably be included, and hence the greater proportionate mortality of women and children from such diseases in Alston than in places, which approximate to it in character in all respects save the occupation of their inhabitants. Certain it is, that lead miners and coal miners are in the north of England readily distinguishable by their aspect, both from each other and from the rest of the world, by persons conversant with their appearance. It is not unimportant to observe that the majority of the men of Alston who die of pulmonary diseases are returned as having died of asthma.”

This last statement has the following explanation. Mr Thackrah³⁴ says, “Lead miners are injured by working ore in sandstone, but are sensible of no inconvenience when the ore is limestone. The reason assigned for this difference is, that the latter is full of vertical and other fissures, which allow the superincumbent beds of water to percolate through the roof of the mine, whilst the sandstone strata, which are impervious to water, preserve the mine quite dry; consequently, the minute particles of rock formed by blasting or the pickaxe are kept in a dry state within the sandstone mine, forming, as it were, an atmosphere of dust, which the miner is constantly inhaling.”

Evidence to support the relationship between lead mining and pulmonary disease can be found in both the Mitchell and Kinnaird report.

In evidence to the Mitchell Report of 1842³⁵ the following evidence was given:

“155. Mr. George Arnison says, —

Although the ventilation of the mines is, with few exceptions, good and efficient, much superior to what it was some 30 years ago, yet even in those parts of the mine where it is the best, and where there is neither a deficiency or vitiation of the air, the miners are continually respiring whilst at work in the mine an air (however good in other respects) highly charged with minute particles of dust, smoke, and other effluvia, arising from their constant operation with the pick, the jumper, &c, and the frequent explosions of gunpowder used in blasting the mine.

“156. Mr. John Robinson says, —

A man by inhaling the powder-smoke and effluvia of the mine injures his lungs. There is the perspiration off the men as well which hurts them. There is a great quantity of sulphur in the spar, and the miner inhales it. There is arsenic combined in the stuff.

“157. That the air is often very bad, is proved by the evidence of practical miners.

Mr. Jacob Crawhall says, —

Sometimes there is foul air sets into the mine; sometimes, when we are driving far from the air-course, and are obliged to do it, the air comes in which puts the candle out, and we are obliged to leave. Not many are suffocated by it, only very few.

It is not proper to stop after the candle goes out. Sometimes we must hang the candle half perpendicular that the grease may flow down to the flame of the candle, and burn in spite of the foul air. It is seldom necessary to do this, but perhaps it maybe a place in which this must be done.

“We never have any air which explodes; we have only the heavy foul air, the damp. We have most foul air when the weather is dull and the clouds hang low. In clear dry weather it is much better. When the foul air is breathed it breaks a person's wind. It is very seldom that men stop in so long as to fall down, and need to be carried out.

In mines where there is bad air the boys are of little use, and cannot stand it, and it is thought best not to have them.

“158. Mr. John Rain, a working miner, says, —

I am not aware of any difference of the mine between summer and winter, but when it is wet and dull the air is bad. We have a level below the level by which we enter, but it does not come to-day. Some days the air comes well into the lower level, some days it does not; and what between the powder-reek and the want of fresh air, we have sometimes great difficulty of breathing.

“159. Mr. John Robinson, a working miner, says, —

I do not like it. After the first shot goes off we have the reek about us all day. Our mine is badly ventilated. Our master won't do what would make it well ventilated, and the men cannot afford to do it.”

This issue of bad air and mine ventilation reoccurs in the Kinnaird report of 1864, in which is given descriptions of various mines.

A report by Captain W H Rowe on an inspection of Smallcleugh³⁶ mine that he visited on the 19th September and the 20th November 1862, gives a good description of the mine, which I include below.

“SMALLCLOUGH ADIT LEVEL - NENTHEAD LEAD MINE, about three quarters of a mile SE of the village of Nenthead; 130 miners. Workings first visited about half a mile in a southerly direction from the level mouth, at the junction of the “Carrs” and “Long Clough” veins; depth from surface at the water blast shaft 621/2 fathoms. Driving a forebreast 20 feet high, and 15 feet wide on the Long Clough cross vein southward are 5 men, 6 fathoms from current; space behind is filled with deads as they proceed, leaving the size of an ordinary level or drift on one side, through which the stuff is wheeled, &c. Temperature at forebreast 58.5°. The next working is 7 fathoms from draught, 4 men taking down roof of a drift on a small E and W vein, about 5 feet above roof, and about the same width; drift arched to within a yard or two of forehead; temperature of air 59°; near this is a large open working in which four men are making a rise towards another flat, height of rise about 12 feet, size about 8 x 5 feet; temperature of air 59.5°. Further south are 6 men driving a forebreast northward towards the first-mentioned place, 19 feet wide and 16 feet high, open behind forebreast for a distance of 10 fathoms. This is ventilated by a branch pipe from the air boxes at the main level about 10 fathoms distant, and 90 fathoms from the blast alluded to; temperature at forebreast 59.5°. The water-jet fan is supplied by a column of 4-inch pipes 62 fathoms high, the hole through which the jet acts on the blades of a circular fan is 5/8 of an inch in diameter; diameter of fan 1 foot 6 inches, 6 wings 6 inches square, pipes leading from machine 5 1/2 inches in diameter. When the water is abundant this blast is powerful, but was weak during our visit, there being not

more than about 10 fathoms column of water. The workings not being many fathoms above the main level, the ladderways need no more notice other than they are wooden staved ladders firmly secured.

"In the same level, about 130 fathoms east of the workings before named, is the first cross cut south to the new discovery of ore lately made, being on the course of what is called the "Long Clough Second Sun Vein". A plain hand fan blast fixed in the main level, where there is a regular or steady current, from this, 5 inch pipes lead along the cross cut south 16 fathoms, then in the level east 10 fathoms more, 6 men are employed driving this forehead towards another forehead and level coming west from another cross cut 90 fathoms further east; at the end of the first-named driving the bottle of air marked W was taken. Barometer at 28.50; thermometer 62°. At the mouth of the second cross cut going south is an air rise to a higher level, and to the surface; in this rise is a column of 5 inch pipes, 20 fathoms high; the jet of water at the bottom enters a bell-mouthed pipe, there being no fans as in the other blast. The air pipes are laid along the cross cut south 50 fathoms to the level on the same vein as the last driving, then on to west forehead 40 fathoms further. Here are 6 men driving a level similar to the last about 6 feet by 4 feet. Temperature of air 66°; barometer 28.56; bottle of air marked X. Back, east from the end 26 fathoms, 18 men are engaged breaking ore from the roof of the level about 2 fathoms high and same wide, and about 7 or 8 fathoms long. Temperature as also 66 here; barometer 28.58; a sample of the air contained in bottom Y. At this point there is an intermediate branch level or cross cut communicating with the main level, making this working somewhat independent of the blast, which is exclusively intended for the forehead.

"The average gettings of the miners in these mines, which may be taken as a specimen of the district generally, are 16s per week full pay, once every three months, but advanced 11s per week monthly. No boys under 14 years of age work below. Size of jumpers used in boring 11/16 of an inch, copper pricklers; instead of safety or straws, 'squibs' made of paper are used, which are greased in wet ground. Accidents from blasting are rare. The miners' club fund here is sustained by each member contributing 30s per year, who in the event of accident or sickness receives 7s per week, while unable to work. After 65 years of age a member is entitled to £1 per month as a pension."

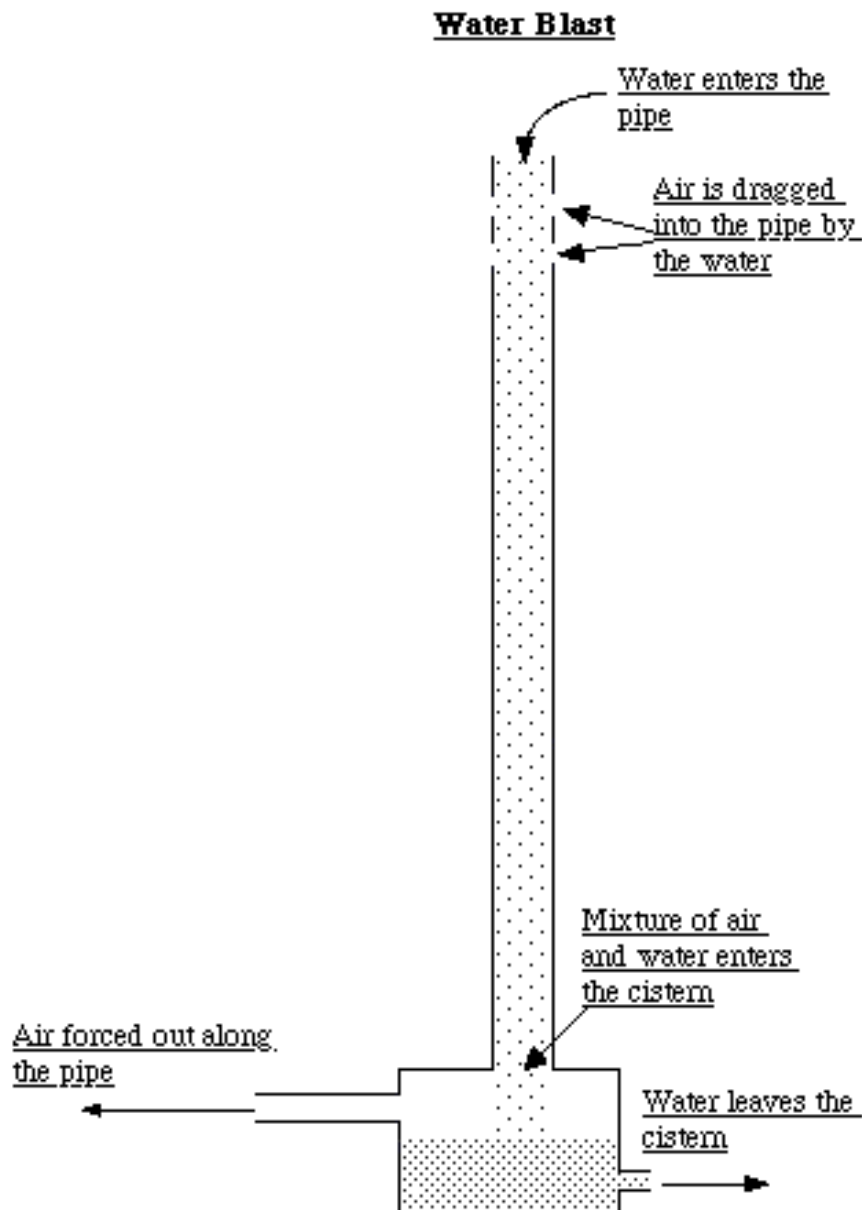
Mines were ventilated by means of connecting shafts, some of which would go to the surface, or by running a second level from the air into the hill and making communication, via shafts to the other levels, so providing a circulation of air. This is unusual rather than the norm, running another level or sinking shafts involves a great deal of expenditure, and the mines may not be worth it. There were artificial methods of ventilating a mine, one such involved the use of furnaces to heat the air and cause a circulation of air.

Joseph Cain³⁷ described the result of erecting a furnace at Burtree Pasture mine for ventilation, "... It has only been lighted four or five days, and so far the result is very beneficial." This system had already been in use in Allenheads and had been found to be very effective in ventilating the mines. Trap doors were also used to direct the air to those places which it was most needed.

A door still to be seen in Smallcleugh mine could well be an example of this method. In other areas especially the extremities of the mines, it was necessary to pump air along pipes for the miners to be able to work.

The most common method of supplying air was the use of a water-blast. This consists of a pipe which has holes drilled into near the top, water is fed into the pipe and this forces down the air which is trapped with it; at the bottom the water and air falls into a cistern, the air has no way of escape other than along a pipe

near the top of the cistern; this pipe carries the air to that part of the mine where it is needed. This resulted in good fresh air being taken into the mine and the foul air being forced out along the level.



Originally wooden pipes were used, which rapidly decayed, making the air impure; and they were very difficult to keep watertight and air tight but by the mid 1800's these were mainly made from iron. Robert Stagg introduced iron pipes at Rampgill, and Joseph Dickinson first used lead pipes for ventilation in the Nentforce level. Another method employed was the use of a fan, which could be worked by hand, or water, examples of which can be found in Rampgill and Coalcleugh mines.



'Windy Billy' Ventilator Fan, Nenthead Mines

The use of a ventilator fan did not necessarily result in good air, a miner commented in the Kinnaird report "...we had a fan blast in that place but there was no good air. When the fan blast was put there, the air that came was not good."

Robert Bainbridge described the methods used by the London Lead Company³⁸. "They force in fresh air, pure atmospheric air, into the fore ends, where the men are working. I mean forcing in the air where we are driving a level, by a water blast or a fan blast. Sometimes it is worked by men (Fan Blast) and sometimes by waterpower. If we are driving a long level, our object is to get a water blast down a shaft, or from the inclination of the hill, which we are generally able to do from the springs, bringing them down in close pipes, and so get 15 or 20 fathoms of pressure, as we find it convenient, and then the escape of that water through an opening in the bottom, into a pipe at the end, forces the air forward a great distance."

Despite these improved methods of ventilation the workmen still had to breath bad air, Robert Bainbridge admitted to the commission that men still suffered from bad air but he felt that it was the dust and gunpowder smoke that had the greatest effect on the miner's health.

In Dr Peacock's report³⁹ in talking about the men examined in the mining districts of Alston, Nenthead, Allenheads and Weardale, that by far the most common disease was Bronchitic affections, miners asthma; this disease constituted 18 out of the 25 cases. In three of these cases the illness had just commenced but the

remaining 15 were incapacitated and could not follow their normal occupation. He found that the men became incapable of work on average at 55.07 years of age, or at the extremes the ages of 63 and 46; and on average these men had worked 40.6 years in the mines before becoming ill, the extremes being 57 and 28 years. He pointed out that he was told that, "all miners who have attained middle age suffer in their breathing more or less, and that many of them who are young are similarly affected, though they will not acknowledge it." He then goes on to quote Dr Ewart the resident medical officer of the London Lead Company at Middleton Teesdale. "A healthy young man enters upon work in a lead mine; and a few years more or less, he begins to experience some degree of difficulty of breathing, nothing to hurt him very much as he continues an efficient miner; still, however, 'he is touched in the wind'. Along with this difficulty of breathing there is an increased expectoration of mucus, often tinged, more particularly after leaving work, of bluish black colour. The difficulty of breathing continues, and generally increases as age advances, rendering worse, perhaps, by an attack of bronchitis now and then supervening. On recovering from these attacks, he again resumes work; or should it happen that he has no acute attacks, he goes on working with increased shortness of breathing, expectoration and failing strength. His appetite for food is impaired, and what he takes for breakfast is frequently vomited as he walks to his work in the morning. He has great languor, and frequent fits of severe coughing, and evidence of imperfect oxygenation of the blood in the blueness of the lips, &c. He may now have got to 40 or 45 years of age, he is low in health and strength, and is compelled to give up work, and stay at home as a worn out miner." In conclusion Dr Peacock blamed this ill health of the miners on "powder reek" "that is the unoxidised charcoal, smoke and dust created by the explosion, as well as the dust created from the boring of the rock." He did not consider the temperature of the mines or ladder climbing to be a cause of ill health in the miners.

Dr Railton Gill⁴⁰ when questioned, stated that he thought the cause of the miners bronchitis was the deposition of carbonaceous matter in the lungs, along with dust gunpowder residue and smoke from candles. He also offered the following information:

"In the lead mines of Alston Moor the work is almost entirely blasting with gunpowder, and the effects on the lungs are such as invariably produce dyspnoea, with occasional attacks of bronchitis, with expectoration of mucus tinged with carbonaceous matter. This tint varies from a grey to a black colour, and the symptoms vary in severity according to the time spent, generally from 20 to 30 years. On approaching the latter period however the vital power is weak, the pulse frequent, more or less anorexia, dyspnoea, asthenic bronchitis, with the usual signs of emphysema are present; the expectoration when advanced, grey or black, but mixed with mucopurulent secretion from the congested mucous membranes, the strength rapidly declines, and death occurs almost in the same way as in tubercular consumption with the exception of the symptoms arising from the frequent complications of the latter."

Robert W. Bainbridge⁴¹ when asked if one rock produced more dust than another said that sandstone and shale produced more dust than limestone. Tinniswood Millican stated that miners were more healthy in wet mines than dry mines, and suffered less from respiratory diseases; he also stated:

"Some of them work a good deal in a sort of damp mine, and others work a long time in a dry mine. I remember some who worked in a dry mine and died sooner than they would have done had they been working in a wet mine, so far as I was capable of judging."

Dr Arnison in his report to James Mitchell stated that working in a damp mine was less harmful than working in a dry and dusty mine.

The evidence collected showed that despite knowing that the use of water would reduce the amount of dust produced as well as increase the rate of boring, it was rarely used. The reason for this was most likely a matter of convenience, carrying water in pails, would not be an attractive prospect, and as one miner pointed out when you are boring upwards you cannot put water in.

Thomas Watson⁴² gave evidence relating to the presence of Carbonic Gas in the mines.

“14,374. Have you ever driven any level where, when the men have been working, the candle would not burn up-right? —Sometimes when a place has yielded a considerable quantity of foul air we have met with it in that way, in pile great limestone there are a great many crevices; it sometimes happens when the weather is going to be bad, that out of these crevices the foul air is blown.

114,375. The foul air you think comes out of the crevices? —Yes, I think there is little doubt about that; I think I at least that it comes from there, there is no opening from the surface or from any other quarter that we are aware of; it just comes in from some place lodged in the rock; at what distance it may be from where we are working we cannot tell.

14.376. What do you consider to be foul air? —We call it foul or bad air. We commonly use the words foul air or bad air or impure air; but, perhaps, strictly speaking, it is carbonic acid gas that comes out of the limestone.

14.377. How do you discover it? —It nips the candle out.

14.378. Do the men feel it before the candle is nipped out? —Yes, they feel a difficulty in breathing, and the candle burns dimly. If the working is not sufficiently impregnated with gas so as to extinguish the light, then order to test the quantity that is coming into the work—they apply a candle to a crevice, and then if it be powerful it at once extinguishes the light as it comes out of the crevice. We have had hundreds of instances of that kind in the great limestone. And there is another thing, what comes out of the crevice always takes the bottom; flows at the bottom, and the candle is extinguished there when it would burn quite easily at the roof.”

Dr Ewart⁴³ identified a concern he had regarding the clothing of miners, stating that they wore flannel shirts with sleeves, which were continually full of dust.

There has been a great deal of research carried out looking at the respiratory diseases associated with lead and zinc mining, the two diseases most often referred to are Phthisis and Silicosis.

The following description of these two diseases is given the Journal of South African Studies (1978).⁴⁴

“For practical purposes there is a distinction to be made between silicosis and phthisis. The former illness is characterized by its non-infective nature and by its tendency to predispose towards the development of tuberculosis.

The latter, although initially a form of pure silicosis, is in fact a composite disease upon which an infective process has been superimposed. Silicosis, which is a condition of fibroid change in the lung, arises from the presence in the lung of very fine silicious particles deriving from a dust-laden atmosphere.

Phthisis, which develops from this fibroid change is a disease with an infective tuberculous element added. Generally speaking, the liability of miners to contract phthisis increases in proportion to the degree of silicosis present in the substance of the lung”

The amount of dust in the air, the size of dust particles, the type of dust and the length of time a miner was exposed to the dust, length of shift, number of years of working are all factors which can determine how severely a miner may be affected.

Both Charles E Thackrah and Robert Bainbridge identified that respiratory diseases were most common in miners who worked in sandstone, those working in limestone being affected less. Silicosis and Phthisis are caused by the silica particles inhaled therefore it is obvious that rocks with a high silica content will put the miners at a greater risk. The table below gives approximate values for Silica content in rock.

Rock Type	% Silica
Sandstone	95+
Slate	35-40
Shale	20
Granite	30
Limestone	1

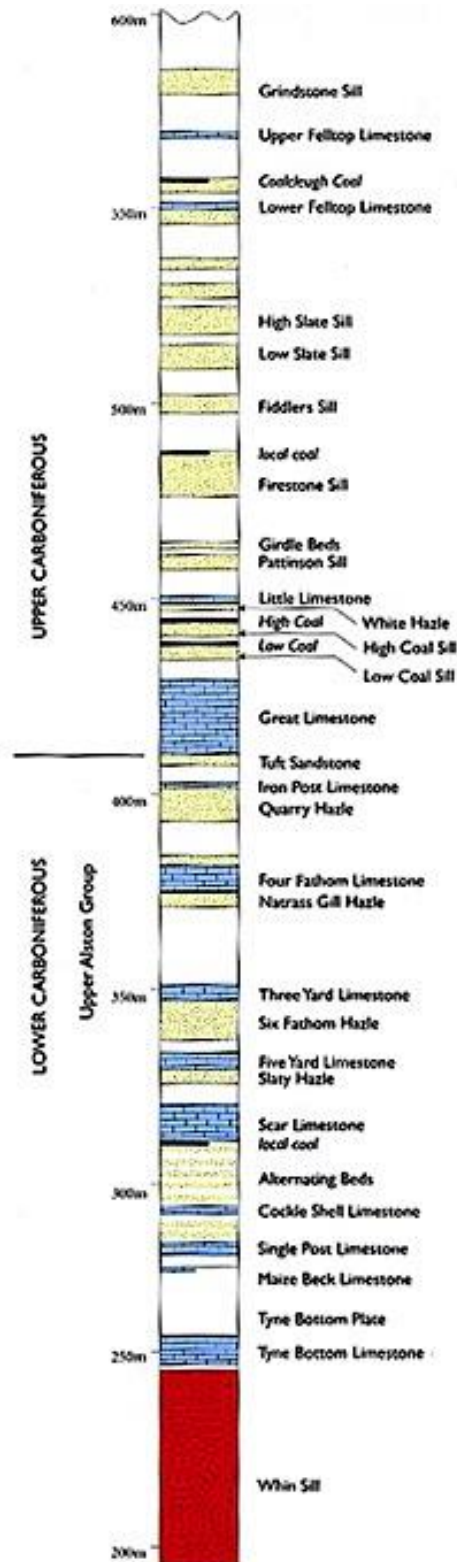
Care needs to be taken in relation to limestone as some limestone's can be rich in silica especially when associated with mineral veins. It would also be very unusual for miners to only have to drive through one type of rock so despite the lead veins in Nenthead being predominantly in limestone, to get to these the miners needed to work through shale and sandstone rocks. The diagram below shows the various rock strata that was encountered by the miners, and the following extract from the London Lead Company records confirm this.

Thomas Dodd report Ladyday 1816⁴⁵

At **Rampgill** Joseph Wallace & Co. are rising into the vein in the Great Limestone and will raise ore. Matthew Thompson & Co. are sinking a sump out of the upper level to the Deep one both for opening the vein in the Little sills (Little Limestone, Coal Hazel etc.) which will raise ore and also to accommodate the mine with fresh air.

Brownley Hill Paybill Sept 1833 to Sept 1834 shows John Brown & 4 partners had been paid £42 for Sinking into and Driving in Quarry Hazel 14 fathoms.

William Wallace 1856 report:⁴⁶ Black Ashgill vein produced ore in the Quarry Hazel in the Grassfield mines (they were however barren in Four Fathom Limestone). In a short length of ground Guddamgill burn vein was productive in the same stratum. In the Black Ashgill mines about 40 fathoms of Blaygill Cross vein was rich in Quarry Hazel, but barren in Four Fathom Limestone.



Section Showing the major strata occurring in Alston Moor, based on the sequence at Tynehead
 Source: Introduction to the Geology of Alston Moor by Russell Bulman pg. 3 (pub 2004 NPHT)

The development and use of explosives and mechanical drills increased the amount of dust in the air. The introduction of dynamite which produced an explosion of greater energy than gunpowder resulted in the production of a finer dust. Alfred Nobel invented dynamite in 1867 and by the 1870's it was being used in mine's, when in 1881 his patent expired, his monopoly disappeared and the price of dynamite fell , it was cheaper than gunpowder, safer to handle, and Nobel claimed that his dynamite had 10 times the power of an equal weight of powder.

Experiments with animals have shown the finer the particles of silica the greater risk of silicosis, and that the great problem with small particles is that the time they remain suspended in the air is in inverse proportion to their size.⁴⁷

H. S. Patterson (Dust, issued by the Transvaal Chamber of Mines 1936)⁴⁸ gives the free falling times for the particles as follows:

Size in microns	Time (in minutes to fall 1 foot)
0.25	590
0.5	187
1	54
2	14.4
5	2.5

Drilling machinery was tried at the Weardale Mines belonging to the Beaumont company between 1863 and 1865, but these trials were unsuccessful.⁴⁹

At a time when the price of lead and other minerals had fallen, the desire by mine owners to increase productivity was great, that the speed of mechanical drilling was three to four times greater than hand drilling and had about the same cost per foot was a great incentive to try these machines.⁵⁰ The drills first introduced proved inadequate to the task, the annual report of the Royal Cornwall Polytechnic Society for 1871 recorded: 'The Boring Machine which has been tried in two of the largest Cornish mines has not been very successful in competing with hand labour, and after a trial of several years it is now withdrawn. This fact has, to a certain extent, prejudiced the minds of the miners against all machinery for boring - but it may well be doubted whether the fault did not lie in the particular form of the machinery used - and especially in its large size and great weight'.⁵¹

The machines generally employed in Cornwall and the Transvaal were based on the reciprocating piston principle, (in which the complete drill bit moved backwards and forwards) which not only bored dry but on its return stroke tended to throw out dust and chips of rock from the hole.⁵²

This extract from R. Burt 1892 shows that the drills being used had become more effective:

In 1887 Robert Hunt published figures of the rate of driving using drilling machinery in various mines throughout the country and showed that by their use the largest headings could be driven more than a fathom per day. This was better than was generally possible with hand drilling techniques and required considerably less labour. By 1891, for example, it was claimed that with devices like Bromfield and Ingersoll's Hand Power Rock Drill: Two unskilled men will readily do the work of five or six skilled men using bits and sledge hammers. It does not tire out the men and two men can take entire charge of a drill and work it continuously with the best results'.⁵³

The newer drills no longer worked on a reciprocating principle, the drill rod slid freely in a chuck while a piston hammer struck its end. Without having to move nearly as much mass as the piston-type drill, the hammer drill could operate at around 1,400 strokes per minute, delivering sharp, fast blows to the rock. These hammer drills were best adapted to drilling upward holes. They were not suitable for downward holes because there was no way to get rid of the debris, which made a powder that cushioned the blows. These drills became known as “widow makers” as the fine dust they produced built up in workers’ lungs.⁵⁴

The problem of not being able to drill effectively downwards was solved by George Leyner he developed a drill bit with a narrow hollow core, compressed air was forced down this tube and blown out of a hole in the tip of the drill, so blowing out the dust created this was marketed in 1897. This drill could be used in any direction. In solving one problem he created another in that the compressed air forced out large quantities of dust from the hole being bored, and as a result miners refused to use them. Leyner solved this by recalling every drill his company had built and fitted the drills with a system for passing water through the center of the piston and injected water through the drill steel, wetting down the dust.⁵⁵

This was a considerable improvement on what had gone before but the new drill combined dust with water droplets forming a fine spray, which could then be inhaled. To solve this, instead of passing the compressed air down the drill the exhaust air was vented out the side, the water forced down the drill was sufficient to clear the debris. A further advantage of the use of water was the production of a fine mud in the bore hole which served to act as a lubricant and keep the drill bit cool, this further increased the effectiveness of the drill.

Despite these advances in technology many miners would not use water when drilling, complaining of working in wet conditions, it appears that the miners were more concerned with their immediate comfort rather than the long term implications of respiratory disease.

The Report into the Health of Cornish Miners 1904 identified that the miners were still dry drilling: In the majority of cases the form of spray is not used by the miner except for the purposes of hoodwinking mine officials and inspectors... It will therefore be seen that although several attempts have been made to reduce the ravages among our miners by phthisis, practically little good has been done.”⁵⁶ The report also identified that dust from shoveling ore, and at ore shoots was also contributing to the dust formed, and that it should be kept damp to avoid the dust entering the air.

The Report made the following recommendations:⁵⁷

1. That the use of percussion rock drills in hard stone without satisfactory precautions for preventing the dust being inhaled by the men be prohibited in all mines.
2. That special rules be established under the metalliferous mines regulation act by the management of every metalliferous mine, subject to the approval of the Secretary of State, for the carrying on of the work in such a manner as to reduce to a minimum the inhalation of dust by the various classes of men employed in the mine.

3. That special rules be also established under the same act, rendering it obligatory on the part of owners of metalliferous mines to provide and maintain in a suitable and cleanly condition a reasonable number of sanitary receptacles for the use of men in case of necessity underground, and also on the surface; and rendering it a contravention of the act unnecessarily to pollute any part of a mine with human feces.

The use of wet drilling was in Cornish mines (but not elsewhere) was made compulsory in 1905 under the 1872 Metalliferous mine act. Despite this the miners continued with dry drilling. Appendix O, page 271 of the Royal Commission Report 1914 gives the numbers of deaths due to Phthisis for Camborne Parish, Cornwall for the period 1904 to 1912.⁵⁸

Year	Total Deaths	Male Deaths	Females Deaths	Miners Deaths	% Miners of Males
1904	43	34	9	28	82.35
1905	39	33	6	26	78.79
1906	27	24	3	21	87.50
1907	39	31	7	27	87.10
1908	38	32	6	30	93.75
1909	38	31	7	26	83.87
1910	45	39	6	30	76.92
1911	32	26	6	16	61.54
1912	32	27	5	20	74.07
Total	333	277	55	224	80.87

Unfortunately no reference was made to the occupations of those males who died of Phthisis who were not miners, could they have been working on the dressing floor?

It was the custom at the time in Cornwall for women to be employed on the dressing floor and the breaking of the rock must have created a highly dusty environment, could this account for the 55 women dying from Phthisis?

The Royal Commission Evidence also provides confirmation that the miners were rarely us water when drilling"⁵⁹

Paragraph 21,207 "An inspector visited Dolcoath on September 15th and he could find no spray attached to the machine. The men said the sprays were out of order, and further when sprays were provided they rarely used them. On inquiry the inspector found a spare spray was not available in the mine. The men had got water in pails which was used for wetting the down holes, and the men admitted they drilled the rises dry."

The use of Compressed air drills at Nenthead did not begin until January 1899 as the newspaper article below indicates.

28 January 1899 (Hexham Courant) Nenthead

Working the mines

In connection with the Nenthead mines preparations have been going on for some time with a view to working the mines on a different system than what has hitherto prevailed. The Vieille Montagne Company when they took over these mines demonstrated the fact that they were not at all afraid of speculating. The last scheme is to work the mines with rock drills driven by compressed air, these

replacing the old method of hand drilling. In certain parts of the mines, they have commenced this week operating with the new drills, but the conditions existing do not seem to meet with the views of the men. A meeting held on Monday night appointed a committee to interview the manager Mr C Fernan, and also to demand the following wages. Drillers, chargers and helpers 6s per day, labourers 5s, hand drillers 4s.

The dispute ended quickly and newspapers of the following week reported that the miners had returned to work.

J. Landless (1977) gives the following description of the use of drilling at Nenthead in 1913:⁶⁰

Drilling is performed partly by hand and partly by means of rockdrills and pneumatic hammers, rock-drills being used for driving forebreasts and in very hard ground. About twenty-five machines are at work, comprising McCulloch, Rand, and Cherson rock-drills; Rex, Leyner-Stoper, and Water Leyner pneumatic hammers, which work on columns; and Flottmann, Thunderbolt, New Century and Forster pneumatic hammers, which are manual machines. The consumption of compressed air is about 500,000 cubic feet per working day of 16 hours, or nearly 31,000 cubic feet an hour. The drills are sharpened with a Leyner sharpening machine, driven by compressed air.

The Coal Mines Act of 1911, required that the use of Wet Drilling had to be used when cutting through highly silicacious rock; this regulation did not apply to Metalliferous mines.

Wet drilling began to be used at Nenthead in 1913.⁶¹

Zinc Poisoning

Zinc in its metallic form is a bluish-white shiny metal. Zinc ore is most commonly found as Sphalerite, (zinc sulphide) also known as spelter or zinc blende and it is in this form that it is found in the Nenthead mines. Zinc is used in the production of Brass (zinc & copper), galvanizing steel, white pigment, cosmetics, batteries and in medical products such as zinc oxide tape.

Zinc is needed for the proper growth and maintenance of the human body, and is needed for a strong immune system, wound healing, blood clotting, maintaining vision, cell production, reproduction, and thyroid function. Meats, seafood, dairy products, nuts, beans, peas, lentils, and whole grains have relatively high levels of zinc. Relatively low toxicity in humans and the limited sources of human exposure, suggests that normal, healthy individuals not exposed to zinc in the workplace are at potentially greater risk from the adverse effects associated with zinc deficiency than from those associated with normal environmental exposure to zinc.⁶²

Humans are mainly exposed to zinc through the ingestion of food and in the UK the average daily intake is 8.0 mg.⁶³

Zinc toxicity it is usually related to occupational hazards, taking excessive quantities of zinc supplements or in people who have consumed acid drinks that had been stored in galvanised metal containers. Excessive Zinc consumption can result in:

- abdominal pain
- loss of appetite
- impaired immunity

- copper and iron deficiency
- vomiting and diarrhoea
- exhaustion
- headaches

Vomiting usually occurs after the consumption of more than 500 mg of zinc sulphate. The intake of zinc in the range of approximately 100–300 mg/d (doses likely to induced chronic toxicity) is common among people using zinc-containing supplements and oral zinc medicines (self-medication, prescribed by a doctor or traditional remedies). Intake of zinc in drinking water needs to exceed 15 mg/L to produce nausea, vomiting and diarrhoea.⁶⁴

An average 70-kg adult contains 2-3 g of zinc, making it nearly as abundant as iron. The zinc is widely distributed in the skeletal muscle, bone, brain, GI tract, liver, kidney, lung, heart, retina, pancreas, sperm and uterus. Unlike iron, there is no particular body store for zinc and metabolic zinc requirement must be met by intake of food and supplements. The body controls the amount of zinc stored in the body by reducing the absorption and increasing excretion in urine and faeces.⁶⁵

Zinc can enter the body via the skin, inhalation of fumes and dust and ingestion through supplements, and food and drink. The most likely routes for miners would be the inhalation of dust and therefore absorbed across the alveoli or by ingestion through food and drink.

Inhalation of Zinc Dust

Exposure of miners to zinc ore and zinc dust can result in zinc poisoning.⁶⁶

Research into the health of 66 Zinc miners and 60 Zinc smelters living at Udaipur City, India, was carried out and it found that the miners showed a higher level of zinc absorption than the smelters but on investigation this was found to be due to an increased level of zinc in the foods consumed by the zinc miners, and not due to occupation. The food obtained from the zinc mining area was higher in zinc than in the smelting area.⁶⁷

Unfortunately, I have been unable to further research into the health of zinc miners as a separate group, researchers group lead and zinc miners as one and the main areas of research relate to lung disease which is discussed separately.

Ingestion

As previously stated the human body requires zinc to remain healthy the UK RDA of zinc is 5.5 to 9.5 mg for men and 4 -7 mg for women.⁶⁸

The miners may have absorbed zinc through food that was grown locally but this has not been studied, the other source would be from water. It has been well documented that the residents consumed water from the River Nent and from mine entrances at least in some cases up to 1896. A number of studies have been carried out on the levels of mineral pollution of the River Nent.

The solubility of zinc depends on temperature and pH of the water in question. When the pH is fairly neutral, zinc in water insoluble. Solubility increases with increasing acidity. Above pH 11, solubility also increases.

The most significant zinc ores include sphalerite (ZnS) and smithsonite (ZnCO₃). These compounds end up in water on locations where zinc ores are found.⁶⁹

C. A. Nuttall and P. L. Younger reported that the concentration of zinc in the main River Nent was 1 – 2 mg/l, and that groundwater percolating through the roof of

Rampgill mine was sampled and was found to have zinc concentration of 6.5 mg/l.⁷⁰

A case study of the River Nent published in 2014 gives the following information.⁷¹

The many inputs of metals into the River Nent cause average concentrations of 1.5 – 6.8 mg/l-1 zinc, 0.003 – 0.012 mg/l-1 cadmium (exceeding the Environmental Quality Standard (EQS) by over 30 times) and 0.015 mg/l-1 lead (twice the EQS). Due to this very high pollution, very little invertebrate life can live in a 10km+ stretch of the river. The River Nent joins the River South Tyne at Alston, causing it to also fail EQS for zinc and cadmium for 50 km downstream.

Investigations by Newcastle University indicate that the River Nent contributes over 50% of the total load of metals (lead and zinc) reaching the Tyne estuary every year. Reducing the inputs from mines in the River Nent would improve the water quality of the River South Tyne and help reduce the risks to sediment quality in the Tyne estuary.

Impact of mine water discharges in the River Nent (four discharges):

- Length of watercourse affected=50km (five water bodies)
- Average metal concentration: Zinc = 1.5 - 6.8 mg/l; Cadmium = 0.003 - 0.012 mg/l
- Average flow = 2-14 l/sec
- Load of zinc discharged per annum = 25 Tonnes

It would be fair to assume that when the mines were being worked a much higher level of zinc would have been found in the River Nent from water leaving the mine workings and seepage from the spoil heaps. The question of whether zinc was a significant factor effecting the health of miners cannot be answered as many of the symptoms of zinc poisoning are the same as that for lead, cadmium, and arsenic all minerals that the miners were likely to be exposed to.

Radon Gas

No evidence from the period under discussion exists for this gas and its affects, but as early as the 16th Century, Paracelsus and Agricola described a wasting disease in miners. In 1879, Herting and Hesse identified this condition as lung cancer in their investigation of miners from Schneeberg in Germany⁷².

Radon is a colourless, odourless, and tasteless gas the result of Radium, which is a decay product of Uranium, it has a half-life of 3.82 days, and the bi products of the decay are lead, bismuth and polonium. Radon gas occurs naturally in rock and is released through fissures and of course by mining.

In the atmosphere Radon is rapidly diluted to a harmless level, the danger occurs when the radon is confined in an unventilated or poorly ventilated space such as mine workings.

Studies of Radon levels in metalliferous mines in South West England (tin) and in old lead mines of Northern England have been made and extremely high radon gas levels have been noted in a number of these mines.⁷³

A study of ancient Copper mines in Jordan concluded that "The concentrations of radon gas detected indicate that the ancient metal workers would have been exposed to a significant health risk and indicate that any future attempt to exploit the copper ores must deal with the hazard identified. Seasonal variations in radon concentrations are noted and these are linked to the ventilation of the mines."⁷⁴

The International Commission on Radiology Protection Statement on Radon of November 2009 says “there is compelling evidence from cohort studies of underground miners ... that radon can cause lung cancer”.

There are no early warning symptoms for Radon Poisoning, but the end result does as the evidence shows lead to Lung Cancer, the symptoms of which are: —

- cough that gets worse and does not go away
- coughing up blood
- chest pain is a symptom in about 25% of cases
- shortness of breath
- wheezing or hoarseness
- repeated respiratory infections such as bronchitis or pneumonia

In *Search of a Hidden Landscape*, by David Walker-Barker and Chris Rawson-Tetley, David Walker Barker gives extracts from a conversation he had in 2006, with Jimmy Craggs, a lead miner, in which there is an interesting reference to Radon, “Hope level (*Stanhope*) was hazardous in other ways having very high concentrations of Radon gas, some of the highest this chap had ever recorded.”

We know from current exploration of mines that Radon gas is present in the mines of Nenthead, and at sufficient levels to have forced the suspension of some exploratory work, we have the benefit of detectors, in the nineteenth century its existence was unknown. In well ventilated mines the Radon should have been dispersed to non harmful levels, but as so many of the reports of the time state miners frequently worked in poorly ventilated levels.

When discussing the ancient Copper Mines of Jordan and the effect of Radon on those miners it is stated that, “Comparisons with the populations working in metalliferous mine sites elsewhere during the last century suggest that serious soft tissue disease may have begun to manifest to themselves after 7 to 20 years of sustained exposure.”⁷⁵

Lead Poisoning

Lead in its natural form such as Galena (Lead Sulphide) does not normally dissolve in water, Cerussite (Lead Carbonate) is soluble in water (0.001 grams per litre), lead is most soluble in acidic water.

Recent studies of lead mines and mine waste by the British Geological Survey give the following information. “Mine waters emerging from adits which were used to dewater the underground mine workings can be a source of elevated zinc, derived by the oxidising effects of meteoric waters passing over fissures of rocks containing sphalerite. The mine waters are characterised by high pH and alkalinity. The levels of lead are generally low due to its low solubility at alkaline pH.”⁷⁶

The routes by which lead can enter the body are inhalation (with 30% to 50% of the inhaled dose absorbed by the bloodstream), ingestion (with 8% to 15% of the ingested dose absorbed into the bloodstream) and to a small extent through the skin.⁷⁷

The symptoms of lead poisoning can be:

Irritability

Loss of appetite

Weight loss

anaemia/pallor

Sluggishness and fatigue
Abdominal pain
Nausea/Vomiting
Constipation
High blood pressure
Declines in mental functioning
Pain, numbness or tingling of the extremities
Joint Pain
Fatigue
Loss of balance
Muscular weakness
Headache
Abdominal/Colic pain
Memory loss
Mood disorders
Stupor
Seizures
Coma
Blue tint to gums and skin under the fingernails

Lead poisoning is difficult to identify as many of the symptoms can be associated with other illnesses, or the sufferer may exhibit few or no signs of poisoning. Legge & Goadby (1912)⁷⁸ described the case of a man of 10 stone 7 pounds was reduced in weight to 9 stone 2 pounds in fourteen months, during the whole of which time he showed no signs at all of lead poisoning, and only towards the latter end of the time did he exhibit any blue line on his gums; there were no symptoms referable to lead poisoning.

This may account for the apparent lack of reporting of this disease, yet many of the reports include references to the symptoms of lead poisoning. There are repeated references to the loss or lack of appetite of lead miners, nausea, headache, dizziness, sleepiness, but these are all also symptoms of working in bad air. In addition to these symptoms Dr Peacock in his report for the Kinnaird Commission states the miners suffer from diarrhoea but more frequently from constipation; and they were very liable to colicky pains in the bowels.

The only specific reference to lead poisoning in the Alston district is made by Dr Peacock⁷⁹ in reference to smelters, which I quote below:

"The London Lead Company have smelt works both at Nenthead and Eggleston, in Teesdale, and there were also smelt works in use at Allenheads. Formerly, I was told by medical men, in all these districts, that the smelters suffered from lead colic, and the same was confirmed by the reports of the men themselves. Sometimes, also, they seem to have had the more severe symptoms of lead poisoning, dropping of the hands, &c, but of late years, since the works have been better ventilated, these forms of lead poisoning have entirely disappeared, though the men still occasionally have colicky pains in the bowels, constipation, &c, and those especially suffer in this way who are employed in emptying the flues. Of 25 men whom I examined at different works, who either were then or had been employed as smelters, 10 stated that they had never had any symptoms of lead poisoning, and the other 15 said that they had formerly suffered to a greater or less extent; and all but five stated that they still occasionally had colic and constipation, though none of them apparently to any serious extent.

"I examined the condition of the mouth in the men I have mentioned, and of the whole number 14 displayed the blue line upon the edges of the gums to a greater or less extent, several had their teeth and gums in a very unhealthy state, and some were pallid and anaemic looking. I did not meet with any cases of paralysis from lead. The acting superintendent of one of the mills had apparently had a sharp attack of lead colic.

"The men stated that when they entered the flues from the furnaces and the condenser to clear them out at stated intervals, the sulphurous and other gases tried them very much in their breathing, and that occasionally they suffered; from pain and confinement of the bowels afterwards. The flues are, however, by recent improvements, to a considerable extent emptied of their contents, and especially of the lighter and therefore more injurious portions, by currents of water which are continually passing through them, and thus the men are less likely to suffer.

"I was told that at Nenthead the exit chimney of the smelt mill was formerly situated at about 800 yards from the furnaces, and in a somewhat lower situation, and at the time the residents in a group of cottages near the chimney suffered from symptoms of dyspepsia, with a tendency to colic. Since the chimney was placed at a further distance of 400 yards, and in a more elevated and exposed situation, this has entirely ceased.

"I was assured from the experience of the Benefit Society of the London Company that the smelters were longer lived than the miners, and amongst the men whom I examined were several in very advanced life, and who were yet hale and strong for their ages."

The Mitchell report mentioned that the smelt mill chimney at Nenthead was close to the road, commenting that the smoke was offensive to travellers, and when the wind blows the smoke towards the washing floors it must be disagreeable.

The subject of Lead Poisoning amongst lead miners was discussed in a paper presented in the British Medical Journal of 15th August 1857, The Lead-Miners of Derbyshire: and Their Diseases. By William Webb, M.D., M.R.C.S.Eng

"In some cases, besides the general prostration and other symptoms of lead poisoning, I have observed the characteristic deposit of sulphuret of lead on the edges of the gums. Under such circumstances, sulphuric acids in full doses, with the black draught of ordinary use, are the best remedies, and, with their employment, the patient is soon restored to his accustomed health. Cases of this kind have been observed, in which the subjects were working, only amongst galena or the ordinary sulphide of lead, clearly proving that lead in this form may be so absorbed as to poison the system and although I have never seen a case of paralysis or dropped hand in miners that I could trace to poisoning, by galena, I have repeatedly observed the characteristic blue line, witnessed the concomitant symptoms, and even had occasion to treat several cases of colic in men who were getting no other form of lead besides galena.

There is a notion prevailing among the miners and smelters of this district, that persons engaged in their occupations who take plenty of fat bacon, butter, or indeed fatty matter of any kind, enjoy a remarkable immunity from lead-poisoning. I am unable to bring any very strong or conclusive testimony in support of this point, or to advance any satisfactory opinion as to the *modus operandi* of these substances. I nevertheless think that some credence may be given to the general report, as, at a large smelting establishment in this district, whilst the men, I am told, suffer periodically from the milder forms of lead-poisoning, they are considered to save themselves, by taking plenty of fatty material, from the more severe and less tractable maladies. I may mention that some smelters have continued to follow their employment, with periodical intermission, for upwards of forty years, by observing this simple precaution, which, as far as I know is the only one observed in this neighbourhood.

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Dr Webb went on to say that it was rare in his district for a lead miner to die under the age of 60, this he said was due to: —

- The regular out-door occupation and exercise (farming).
- The small number of hours employed (6 or 8 hour shifts)
- Personal cleanliness, and moderately steady and prudent habits.
- Good and nutritious food, with plenty of fatty material.
- The general situation of the dwellings, and the neatness and cleanliness observed therein.
- The salubrity of the district.

Legge, and Goadby (1912)⁸⁰, examined the effect of food on the absorption of lead in the stomach and intestines, and concluded that "No work in a lead factory should be commenced in the morning without partaking of food, because if food be present the opportunities for absorption of lead are greatly diminished, and of all foods the one recommended as the most efficient is milk, or cocoa made with milk."

They also commented on the dust containing lead that could accumulate in the mouth: "It follows also that the care of the mouth and gums should be rigorously enforced upon all persons employed in lead trades, as the mere mechanical facilities for the accumulation of debris around the individual teeth tends to increase the quantity of lead dust that may be retained in the mouth. This is gradually rendered soluble and absorbed, through the action of the bacterial acids which are always produced along the gum margins when any entangled food is retained in the interdental spaces."

Dr T. H. Jackson⁸¹ when talking about the miners of Arkendale and Swaledale in 1857 identified a problem with miners clothing as had Dr Ewart:

"Another exciting cause of ill health is their clothing, which consists of coarse flannel worn in contact with the skin, and covered with a loose harden jacket, or kitle. On their return to their domiciles, these garments are cast off, and hung up to dry; thus their dwellings are saturated with damp and noisome exhalations, which arise from the mud and moisture retained in their clothes. These exhalations are most detrimental to lifespan; especially, as in many instances there are large families crowded into very small and ill ventilated cottages."

The miners were constantly at risk from breathing in and or ingesting lead particles it is nearly inconceivable that this did not have some effect on their health in addition to the respiratory diseases, which they suffered from.

Dr Jackson in his report in the British Medical Journal in 1857⁸² said that:

"The miners of this part of the country, unfortunately, have no fund amongst themselves, to which they can appeal when suffering from accident or disease, nor do their employers encourage them to make any provision of the kind. The consequence is, that when a lead miner with a large family meets with misfortune, or has an accident in the mines, or is incapacitated by sickness and disease, he is under the necessity of locating himself in the poorhouse to obtain sustenance and medical aid.

"The miners commence to learn their calling at the age of 10 or 12. Their first occupation is turning the windy king, a species of fan used to ventilate the mines. At the age of 14, they proceed, like their forefathers, to ply the pick, the hack, and the shovel. No doubt, the inhaling a vitiated atmosphere in their boyhood tends greatly to hasten premature disease and decadence. Thus, the worn-out man " shuffles off this mortal coil", and passes into the silent land, unheeded and uncared for by his employers, his place being supplied by new material, which treads in his predecessor's footsteps, until he in his turn is worn out and supplanted."

In comparison the miners working for the London Lead Company had the advantage of the services of a doctor paid for by the Company, and a the benefit of the "Working Man's Fund" which meant they received medical and financial assistance when ill. They also had the benefit that the lead Company did not permit miners under the age of 18 to work regularly underground, Tinniswood Millican did say that the boys were allowed underground from the age of 14 they would wash the ore outside in summer and in winter when they could not continue washing the ore they went underground.

The Kinnaird report gives information relating to the age at which miners began to suffer from "Miners Asthma", Tinniswood Millican gave the age of onset as 40 and that most miners were affected by 45. Dr Arnison gave the age of onset as 30, and went further to say that of 60 or 70 miners of the district 17 would die before they were 50, and it was rare for them to attain the age of 60 years.

William Hewitson the doctor at West Allendale gave more detailed information regarding 100 miners that he had examined:

"I found only five per cent, affected with incipient asthma under 30 years of age. Of course those 100 were men of all ages. Between 30 and 40, 20 per cent, will be found to labour under pulmonary disease of some sort. Between 40 and 50 years of age, 30 per cent, have decided asthma; 50 per cent, have asthma in the incipient stage, and 20 per cent, are free from disease. That is a greater proportion of persons free from disease than I expected to find at that age. Between 50 and 60 years of age all are affected more or less; about 60 per cent, are affected, but not to a great degree; about 40 per cent, are cases of greater severity. Between 60 and 70 all are affected more or less in their breathing."

Dr William Ewart at Middleton in Teesdale reported⁸³ that he had seen miners as young as 20 or 21 attacked by bronchitis, and that by the age 35 most of the miners had an attack, he stated that he had recently treated a man of 25 or 26 years. The general consensus was that it was rare for a miner to be able to work past the age of 50 years.

In 1842 Chadwick⁸⁴ gave information relating to the lifespan of miners in the Reeth District: —

"Captain Harland, the chairman of the Reeth union, York (North Riding), in a communication to Sir John Walsham, states, that he has been anxious to ascertain as correctly as possible, first, the average duration of life among the mining population of the respectively parishes in that district, and how far it appeared to be affected by their general habits as well as by the state of their domiciles; and he gives the following results: "By a careful examination of the parish registers, I find that in the last seven years there have died in –

The parish of Marrick	15 miners; average age, 47 3/5 years,
The parish of Arkendale	70 " " " 45 19/36 "
The chapelry of Muker, in the parish of Grinton	39 " " " 45 29/39 "
The remainder of the parish of Grinton, viz.. Grinton Reeth and Meblecks	40 " " " 54 39/40 "

Total, 164; general average, 48 13/264 years.

"The prevailing diseases throughout the whole district are bronchial affections and rheumatism, which may generally be attributed to exposure to cold and rain after leaving the close, warm atmosphere of the mine.

The miners' dwellings in Marrick are small thatched cottages, situated very near their work; they are consequently less exposed to wet and cold on their way home, but (although dry and kept tolerably clean) from the want of room and proper ventilation, the inmates are more liable to contagious disorders than the more comfortably lodged miners in the parish of Grinton. In Arkendale the houses are of a somewhat better description, but the drainage is imperfect; the habits of the people filthy and intemperate; cutaneous disorders very common; and they are frequently the victims of typhus and other malignant fevers.

"In the parish of Grinton the houses are of a decidedly superior description. Forty years ago they were mostly thatched with ling or heath; a thatched house is now rarely seen. The miners are all comfortably lodged, generally well clothed, clean, and orderly in their habits; and I have no doubt to these causes may be attributed the great difference between the mortality in this parish and that of Arkendale in the same period.

In Muker the mortality, in proportion to its population, has been nearly the same as in Arkendale; but many of the miners work occasionally in coalmines, are more exposed to storms, by reason of their work being at a greater distance from their dwellings; and those dwellings are also of a description inferior to those of the other townships in the parish of "Grinton. From these circumstances I infer that the average duration of a lead-miner's life, and his greater freedom from disease, have increased in proportion to the increased airiness and increased convenience of his dwelling."

Chadwick goes on to say: —

"I have already referred to the example cited by Dr. Barham of the health of the miners in one mine, the Dolcoath mine, in the parish of Camborne, in Cornwall, where great attention is paid to obviate agencies injurious to the miners.

"Care is there taken in respect to ventilation in the mines. 'The ventilation in Dolcoath is particularly good, and the men are healthier than in most other mines; there are more old miners.

"The group of cases of the mining population from Alston and Garrigill, it appears to me, will, when considered, afford an example of the powerful nature of the physical elements of deterioration. In that district the employers and persons of the higher classes have paid great attention to maintain the means of moral improvement. They have only not been made aware of the practicability or of the importance of sustaining the physical condition of the workpeople, as exemplified in respect to the same description of labourers at Camborne."

Chadwick gave examples of life expectancy from birth for a number of areas, examples of which I show below with comparative information from Alston Parish records.

Liverpool 1840

	<i>Average Age. of Deceased</i>	<i>No. of Deaths</i>
Gentry and professional persons, &c.	35 years	137
Tradesman and their families	22	1,738
Labourers, mechanics, and servants, &c. . .	15	5,597

Leeds Borough 1839

	<i>Average Age. of Deceased of</i>	<i>No. Deaths</i>
Gentlemen and persons engaged in professions, and their families .	44 years	79
Tradesmen and their families	27	824
Mechanics, servants, and labourers, and their families . .	19	3,395

Kendal Union 1840

	<i>Average Age. of Deceased of</i>	<i>No. Deaths</i>
Gentlemen and persons engaged in professions, and their families .	45 years	52
Tradesmen and their families	39	138
Mechanics, servants, and labourers, and their families . .	34	413

Alston Parish 1838-1839

	<i>Average Age. of Deceased of</i>	<i>No. Deaths</i>
For all classes	27.08 years	165
For all classes excluding infant mortality	33.33 years	134

Obtaining data to calculate the age at death of miners is complicated by the fact that the occupation of the deceased was rarely recorded in registers.

During the period 1798 to 1812 the Alston & Garrigill parish records did include the age and occupation of those buried and these can be compared with the parishes of St John's, and St Andrew's, in the centre of Newcastle upon Tyne.

Years	Parish	Average age at the time of death	
		Miners	Non Miners
1798 - 1812	Alston	52.84	55.1
1798 - 1812	Garrigill	48.39	46.25
1798 - 1812	Alston and Garrigill	51.98	53.34
1798 - 1812	St Andrew's	-	49.65
1798 - 1812	St John's	-	52.71

The average age of males over 18 years at the time of death.

The decision to record only deaths of those over the age of 18 was based on the fact that the Mitchell report excluded those under 18 years of age.

From these figures it appears that there is a small difference in age at death in the parishes of Alston and Garrigill between those involved in lead mining and other occupations but compared to those living in Newcastle the Alston miners were living as long if not longer.

The Mitchell report of 1842 gives the following statistics for the period 1 July 1837 to 30 June 1841.

Town	Number of deaths	Average age
Alston	75	45.19
Allendale	79	48.13
Stanhope & St John's	129	49.48
Middleton in Teesdale	57	47.25

Average age at the time of death

Unfortunately in this data Mitchell report did not differentiate between miners and non-miners.

In appendix 17, of the Report of the Children's Employment Commission 1842, Mitchell gave the cases of widowhood on the pauper rolls of the parish of Alston and Garrigill, Cumberland, which included the occupation and age of the deceased husbands.

Alleged Cause of Death	Age at Death	Occupation of Deceased Husband
Decay of nature.	83	Miner
Natural decay.	78	Tailor
Not stated.	73	Miner
Decay of nature.	72	Miner
Decay of nature.	72	Miner
Asthma produced from age.	72	Mason
Asthma produced from working in mines.	67	Miner
Influenza.	64	Miner
Asthma produced from working in the lead-mines.	63	Miner
Natural decline.	63	Miner
Consumption.	62	Labourer
Asthma.	62	Mason
Rupture of blood-vessel.	60	Miner
Asthma produced from working in the mines.	60	Miner
Asthma.	60	Miner
Consumption.	60	Miner
Bursting blood-vessel.	60	Miner
Jaundice.	60	Joiner
Asthma produced from working in the mines.	60	Miner
Cholera.	60	Miner
Affection of the liver.	59	Glazier
Apoplexy.	59	Butcher
Inflammation of the lungs.	59	Miner
Asthma produced from working in the lead-mines, which terminated in consumption.	59	Miner

Asthma produced from working in the lead-mines, which terminated in consumption.	59	Miner
Accident by a coal-waggon.	58	Labourer
Asthma produced from working in the lead-mines, which terminated in consumption.	58	Miner
Consumption accelerated by working in the lead-mines.	57	Miner
Consumption.	57	Turner
Influenza, terminating in dropsy.	57	Miner
Asthma.	55	Blacksmith
Inflammation of lungs from cold.	55	Miner
Asthma produced from working in lead-mines.	55	Miner
Asthma from working in the mines.	55	Miner
Pleurisy.	54	Miner
Asthma and rupture of blood-vessel.	54	Miner
Chronic disease of rheumatism.	53	Miner
Asthma produced from working in the lead-mines.	53	Miner
Asthma and bursting blood-vessel.	52	Miner
Asthma produced from working in the mines.	52	Miner
Asthma produced from working in the mines, which terminated in consumption.	52	Miner
Paralysis.	51	Miner
Asthma by working in the lead-mines.	49	Quarryman
Typhus fever.	48	Miner
Killed in lead-mines.	48	Miner
Consumption by bad air in the pit.	48	Miner
Asthma produced by working in the lead-mines.	47	Miner
Consumption produced from a continuance of influenza.	47	Miner
Consumption and asth-	47	Miner
ma. Affection of the head, caused from an accident received in the mine.	47	Miner
Asthma produced from working in the lead-mines.	46	Miner
Rheumatic fever, which produced inflammation of the brain.	46	Miner
Killed in lead-mine.	46	Miner
Dropsy.	46	Joiner
Explosion of fire-damp in a coal-mine.	46	Coal Miner
Asthma, which terminated with dropsy.	45	Miner
Scarlet fever.	45	Miner
Consumption, accelerated by working in the lead-mines.	45	Miner
Inflammation of bowels.	45	Miner
Consumption.	45	Joiner
Dropsy.	44	Miner
Asthma from working in lead-mines.	44	Miner
Asthma produced from working in the lead-mines.	43	Miner
Consumption produced from asthma, caused by working in the mines.	43	Miner
Asthma, which terminated in consumption.	43	Miner
A fall from the 'horse' in the engine shaft.	43	Superintendent
Pleurisy.	43	Miner
Consumption and asthma produced from working in the lead-mines.	42	Miner
Consumption.	42	Miner
Pleurisy.	42	Miner
Found drowned.	42	Miller

Injury from fall of a cart.	40	Shoemaker
Affection of the liver.	38	Joiner
Consumption.	38	Miner
Asthma.	37	Miner
Accident in mine, which terminated in consumption.	36	Miner
Killed in coal-pit.	35	Miner
Water of the head.	35	Miner
Income on leg.	35	Miner
Accident in coal-mine.	34	Miner
Typhus Fever.	30	Cordwainer
Accidental.	30	Cartman
Consumption.	30	Miner
Consumption.	29	Teacher
Affection of urinary organs.	29	Miner
Cholera.	28	Miner
Inflammation of bowels.	27	Miner
Accident at colliery.	25	Pitman
Small-pox.	21	Miner

The average age at death for all listed is 49.64 years, for only the miners the average age is 49.35, and for non miners the average age is 50.21 years.

The Kinnaird commission of 1864 reported the age of those males aged 10 years and upwards who had died in the period 1859 – 1861, in various mining districts.

Town	Average age Miners 10+	Average age Miners 18+	Average age Non-Miners 10+	Average age Non Miners 18+
Allendale	46.74	47.27	52.38	55.41
Alston District	43.93	45	47.84	50.12

Average age at the time of death

The evidence so far points clearly to lead miners having a shorter life span than those not involved in lead mining, the figures examined show a trend towards 45 to 50 years being the average age at death. The cause of this early death from all the evidence observed is occupational rather than any other cause.

In order to try and understand the relative age at death of the Alston District population as a whole the burial figures for St Augustine's Parish, Alston were examined for the period 1801 to 1839

Average Age at death Females	1801 to 1805	1806 to 1810	1811 to 1815	1816 to 1820	1821 to 1825	1826 to 1830	1831 to 1835	1836 to 1839	1801 to 1839
At Birth	39.7	33.7	32.4	27	31.3	31	31.9	28.6	31.9
Over 1 year	44.2	39.6	35.8	34.2	37.4	37.2	36.3	33.9	37.3
13+	56.4	54.1	48.9	51.4	52.7	50.9	57.3	46.4	52.3

Average Age a death Males	1801 to 1805	1806 to 1810	1811 to 1815	1816 to 1820	1821 to 1825	1826 to 1830	1831 to 1835	1836 to 1839	1801 to 1839
At Birth	35.1	31.2	32.8	28.8	29	27.1	31.2	29.5	30.5
Over 1 year	40.8	37.3	39.3	33.0	37.3	32.9	36.7	32.8	36.3
13+	54.5	49.4	52.4	48.4	49.4	48.9	49.0	45.7	49.8

These figures compare favourably with those published by Chadwick⁸⁵ in 1842 for areas with large numbers of tradesmen & labourers within the population, it is only in areas of largely an agricultural population that Alston becomes worse off.

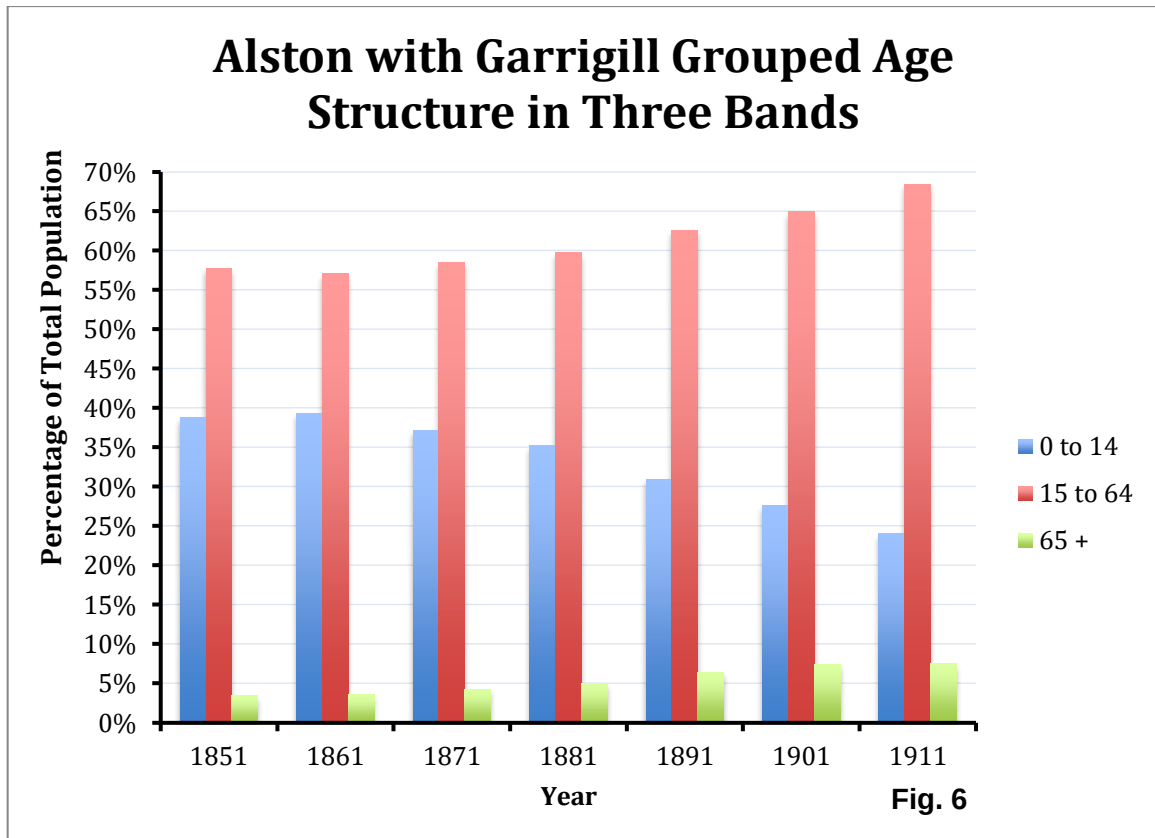
What the figures above do show is the effect of food shortages and high prices that occurred from 1816 through to the 1840's on the health of the population, the difference between life expectancy at birth and that after 13 years of age indicates high infant and child mortality, which is shown in the tables below.

Age Range Females	1801 to 1805	1806 to 1810	1811 to 1815	1816 to 1820	1821 to 1825	1826 to 1830	1831 to 1835	1836 to 1839
Under 1 Year	10.3%	14.9%	9.6%	21.2%	16.3%	16.6%	12.0%	15.6%
1-10	19.5%	23.4%	25.8%	27.6%	24.5%	22.9%	33.7%	23.5%
11-20	7.6%	5.7%	5.6%	7.1%	6.3%	9.0%	3.8%	8.9%
21-30	7.6%	6.4%	14.6%	7.1%	11.1%	11.0%	8.7%	10.1%
31-40	4.9%	9.2%	12.4%	5.3%	6.7%	3.3%	3.4%	11.2%
41-50	5.4%	7.1%	3.9%	6.5%	6.3%	4.7%	4.3%	7.3%
51-60	11.4%	5.0%	4.5%	4.7%	4.8%	8.0%	5.3%	3.9%
61-70	9.2%	7.8%	9.0%	7.6%	3.4%	8.0%	9.6%	6.7%
71-80	16.8%	11.3%	7.9%	6.5%	11.5%	11.6%	11.5%	8.4%
81 +	7.6%	9.2%	6.7%	6.5%	9.1%	5.0%	7.7%	4.5%

Figures shown are deaths as a percentage of the total number of deaths for each age group, St Augustine's Parish, Alston.

Age Range Males	1801 to 1805	1806 to 1810	1811 to 1815	1816 to 1820	1821 to 1825	1826 to 1830	1831 to 1835	1836 to 1839
Under 1 Year	9.6%	16.4%	19.0%	15.4%	29.4%	27.9%	17.9%	18.0%
1-10	23.1%	22.8%	26.3%	33.0%	25.4%	31.4%	26.3%	28.0%
11-20	3.4%	4.1%	4.9%	6.6%	7.3%	9.3%	10.1%	9.3%
21-30	6.3%	8.2%	4.9%	7.7%	9.6%	7.4%	9.5%	12.4%
31-40	9.1%	8.2%	10.2%	7.7%	5.1%	7.8%	6.1%	5.0%
41-50	8.7%	8.8%	13.2%	10.4%	16.9%	9.8%	10.1%	16.1%
51-60	15.9%	11.7%	17.1%	15.9%	13.0%	18.1%	14.5%	15.5%
61-70	10.1%	11.1%	11.7%	13.7%	13.6%	7.4%	12.8%	6.2%
71-80	7.2%	5.8%	9.8%	3.8%	5.6%	7.4%	5.0%	6.2%
81 +	6.7%	2.9%	2.0%	1.1%	3.4%	1.5%	5.6%	1.2%

Figures shown are deaths as a percentage of the total number of deaths for each age group St Augustine's Parish, Alston.



The graph above shows the change in the structure of the Alston with Garrigill Parish (which includes Nenthead) over time, we can see a gradual increase in the percentage of the population living beyond sixty years of age; this is shown more clearly in the graphs below of male and female age structure.

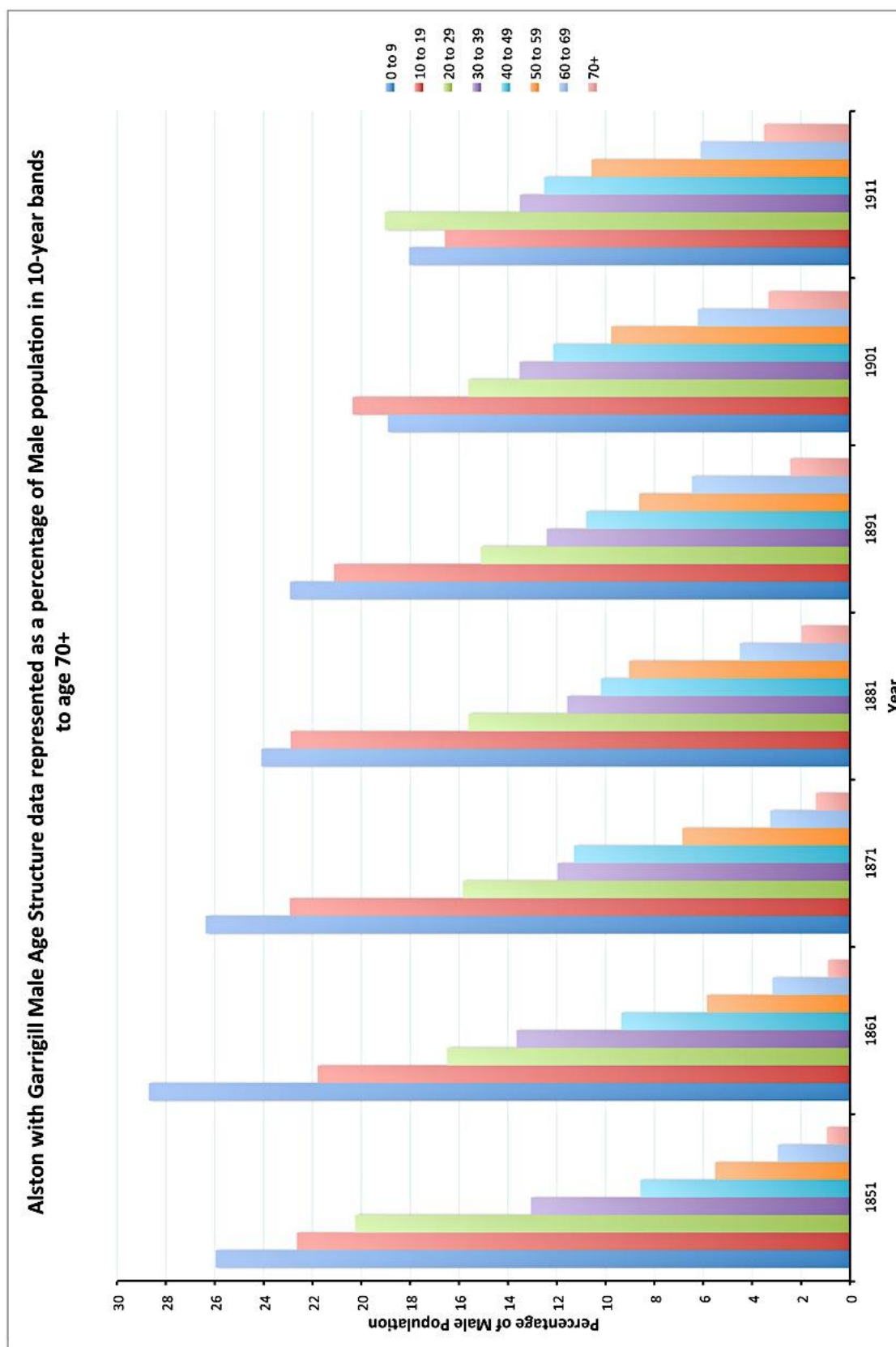


Fig. 7. Source: A vision of Britain Through Time

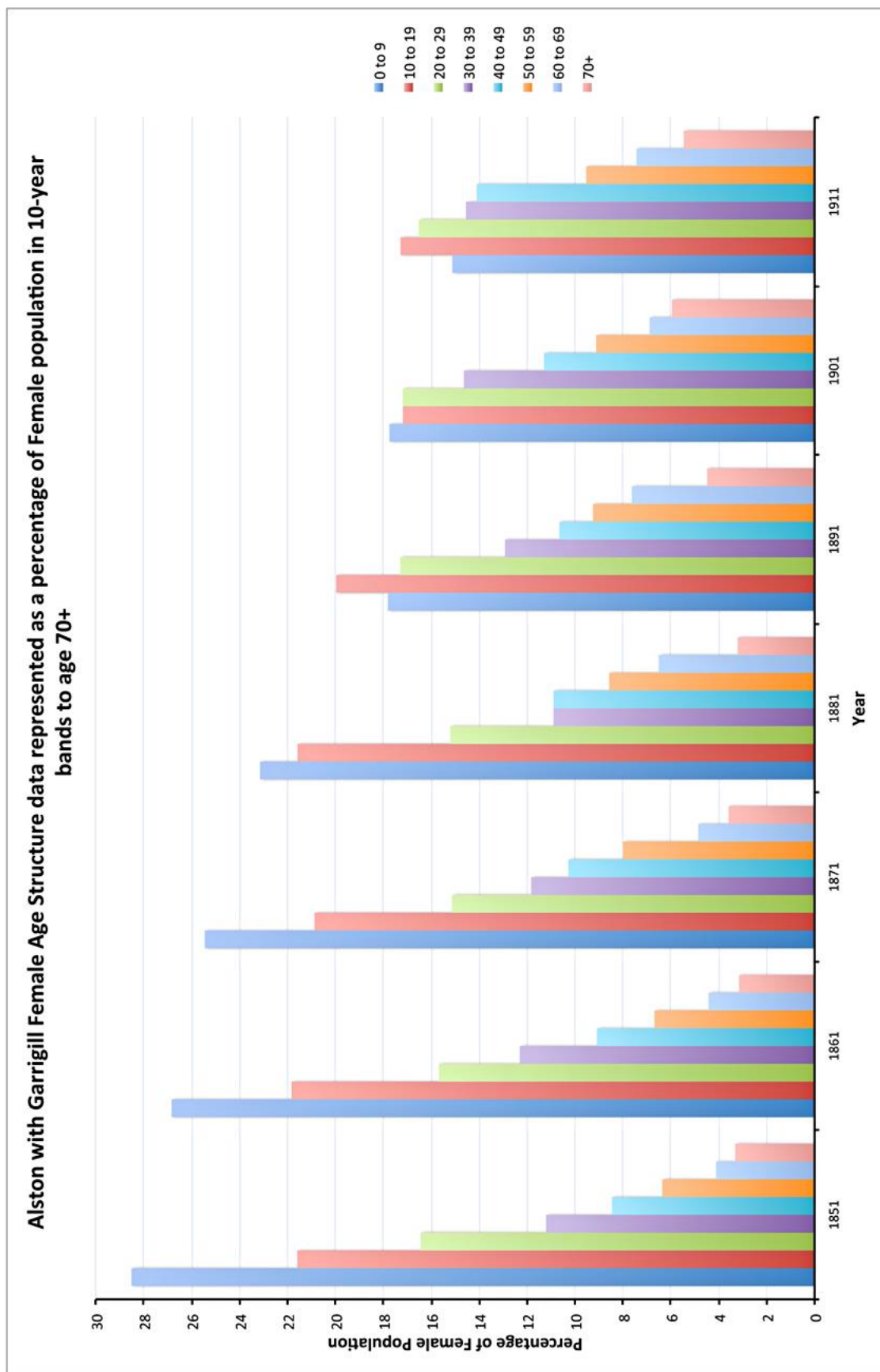


Fig. 8. Source: A vision of Britain Through Time

The Parish records of Nenthead do not show the occupation of the deceased, but the 1851 census shows that at that time 65.16% of the male population were lead miners, 6.2% lead smelters, 10.42% lead ore washers, 3.42%, agents, clerks or employed at the mines in some capacity, which leaves only 14.8% of the population not directly involved in lead mining. The records analysed are from 1850 to 1900.

Average Age at death Males	1850 to 1855	1856 to 1860	1861 to 1865	1866 to 1870	1871 to 1875	1876 to 1880	1881 to 1885	1886 to 1890	1891 to 1895	1896 +	1850 to 1875	1876 to 1900
At Birth	27.8	23.1	24.1	28.9	25.3	35.5	34.1	47	32.9	41.8	25.8	37.6
Over 1 Year	35.27	31.1	34.8	37.9	36.5	43.39	40.32	51.07	47.59	50.35	35.1	45.5
13+	50.7	42.7	46.6	45.9	46.2	52	48.9	53.2	52.5	53.3	46.6	51.7

Males Average age at Death St John's Parish Nenthead

Average Age at death Females	1850 to 1855	1856 to 1860	1861 to 1865	1866 to 1870	1871 to 1875	1876 to 1880	1881 to 1885	1886 to 1890	1891 to 1895	1896 +	1850 to 1875	1876 to 1900
At Birth	31.8	31.8	26.5	31.7	30.8	38.3	37.6	42.3	48.5	48.5	30.1	42.1
Over 1 Year	36.4	38.2	33.4	40.9	40.0	41.7	43.2	44.2	52.1	55.4	37.4	46.4
13+	47.4	50.7	45.9	48.2	53.5	48.5	51.3	49.5	58.9	55.4	48.9	52.5

Females Average age at Death St John's Parish Nenthead

An aspect of life in the Nenthead and Alston Districts that has been largely missed is the effect of lead mining on the female population, other than frequently making them widows at an early age, 1851 census shows 21.4% of the women of Alston are widows).

Headlam Greenhow⁸⁶ did look at the rate of pulmonary illness in the female population.

"The female mortality is also higher in the districts of Aberystwith, Weardale, Holywell, Reeth, and Alston, than in several other districts equally rural, and where, as in these lead-mining districts, the females follow no special occupation. For example, the female death-loss from pulmonary diseases in the registration district of Richmond in Yorkshire, which includes the town of the same name, and is contiguous with the rural and lead mining district of Reeth, is at the rate of 451 per 100,000 females of all ages; that of Reeth is 528. Alston and Weardale are adjoining districts. On the northern border of Alston lies the district of Halt whistle, which is conterminous with the wide tract of country comprised in the registration districts of Bellingham, Rothbury, and Glendale, to which I have already had occasion more than once to refer as one of the healthiest portions of England. The female pulmonary death-rates of Alston and Weardale per 100,000 females of all ages are 494 in the former and 497 in the latter district. The female pulmonary death-rate of Haltwhistle is only 399 per 100,000."

I suspect that the closeness of the washing floors to the village of Nenthead would in itself create a dusty atmosphere, but as the miners returned home to change their clothing would be coated in dust, which would be brought into their homes. The climate itself which at the best of times would dissuade anyone from opening doors and windows would result in smoke from candles and pipes to also pollute the atmosphere of the home, this also means that children would have been exposed to harmful dust & smoke from birth.

When comparing the data for Nenthead with the data from Alston District and that found in the various reports examined we can see that the results are very similar the general trend being that for males living beyond 60 years was the exception rather than the rule. The breakdown of the Nenthead burials data by age range shows a gradual increase in the 61 to 80+ age range over time; but not so great as for females.

Age Range Males	1850 to 1855	1856 to 1860	1861 to 1865	1866 to 1870	1871 to 1875	1876 to 1880	1881 to 1885	1886 to 1890	1891 to 1895	1896 +
Under 1 Year	21.2%	25.9%	31.0%	24.1%	32.6%	20.2%	15.5%	8.0%	31.0%	20.9%
1 to 10	26.3%	22.2%	18.0%	13.9%	14.6%	13.1%	15.5%	4.0%	4.8%	4.7%
11 to 20	2.0%	6.2%	7.0%	0.0%	5.6%	1.2%	7.0%	2.0%	4.8%	9.3%
21 to 30	6.1%	12.3%	5.0%	15.2%	9.0%	4.8%	7.0%	4.0%	7.1%	2.3%
31 to 40	5.1%	4.9%	4.0%	10.1%	4.5%	9.5%	7.0%	14.0%	4.8%	7.0%
41 to 50	9.1%	7.4%	11.0%	5.1%	6.7%	10.7%	9.9%	16.0%	11.9%	14.0%
51 to 60	14.1%	8.6%	13.0%	17.7%	13.5%	26.2%	21.1%	16.0%	11.9%	11.6%
61 to 70	11.1%	11.1%	7.0%	12.7%	11.2%	9.5%	8.5%	24.0%	11.9%	11.6%
71 to 80	3.0%	1.2%	4.0%	1.3%	2.2%	3.6%	5.6%	12.0%	11.9%	14.0%
81 +	2.0%	0.0%	0.0%	0.0%	0.0%	1.2%	2.8%	0.0%	0.0%	4.7%

Figures shown are deaths as a percentage of the total number of deaths for each age group, St John's Parish, Nenthead.

Age Range Females	1850 to 1855	1856 to 1860	1861 to 1865	1866 to 1870	1871 to 1875	1876 to 1880	1881 to 1885	1886 to 1890	1891 to 1895	1896 +
Under 1 Year	12.9%	16.4%	21.6%	22.5%	23.0%	8.0%	13.0%	2.3%	2.4%	20.0%
1 to 10	21.4%	23.9%	23.4%	12.7%	20.7%	14.0%	14.5%	11.4%	12.2%	0.0%
11 to 20	8.6%	10.4%	6.3%	5.6%	3.4%	10.0%	4.3%	6.8%	0.0%	2.9%
21 to 30	12.9%	4.5%	10.8%	18.3%	9.2%	14.0%	11.6%	22.7%	12.2%	8.6%
31 to 40	7.1%	7.5%	8.1%	2.8%	4.6%	6.0%	5.8%	6.8%	4.9%	17.1%
41 to 50	8.6%	6.0%	6.3%	2.8%	5.7%	4.0%	13.0%	4.5%	2.4%	5.7%
51 to 60	7.1%	6.0%	5.4%	11.3%	10.3%	12.0%	7.2%	6.8%	14.6%	11.4%
61 to 70	7.1%	10.4%	10.8%	11.3%	9.2%	22.0%	15.9%	25.0%	31.7%	8.6%
71 to 80	11.4%	9.0%	1.8%	9.9%	5.7%	6.0%	10.1%	2.3%	12.2%	14.3%
81 +	2.9%	6.0%	5.4%	2.8%	8.0%	4.0%	4.3%	11.4%	7.3%	11.4%

Figures shown are deaths as a percentage of the total number of deaths for each age group, St John's Parish, Nenthead.

The data is shown graphically in the Appendix 1.

In order that a more complete picture of the life expectancy of the population of the Alston district and specifically the miners could be ascertained the following sources of data have been examined in detail:

1. References made to the deaths of miners in newspapers.
2. St John's, Nenthead burial records 1850 to 1901
3. St John's, Garrigill, burial records 1850 to 1901
4. Allendale burials 1798 to 1812
5. Burials at the Holy Paraclete Kirkhaugh, 1798 to 1812
6. Burials at St Augustine's, Alston, 1798 to 1812
7. Durham and Carlisle Will and Probate records.

Sources of Data

1. Census records at Ancestry.co.uk
2. Allendale Parish Registers transcribed by Kenneth Mitchell
3. Alston St Augustine's, Burials Transcribed by John Walton Robinson 1909
4. Alston St Augustine's, Burials 1813 - 1839, Indexed by C. Yellowley & G. Bell
5. Garrigill St John's, Burials 1730 to 1812, transcribed by Edwin Dodds and John Walton Robinson 1908
6. Garrigill St John's, Burials, 1813 to 1839, Indexed by C. Yellowley & Entered by G. Bell
7. Garrigill St John's, Burials 1839 to 1901 Family Search.org film number, 0252534
8. Kirkhaugh, Holy Paraclete Burials, transcribed by John Walton Robinson
9. Nenthead St John's, Burials 1850 – 1901, Indexed by C. Yellowley & Entered by G. Bell

The occupations of those buried at Nenthead & Garrigill for the period 1850 to 1901 were obtained by searching census records. It is interesting to note that especially at a later age many miners gave dual occupations, Miner & Farmer, Miner & Grocer &c.

The following is given as a brief summary of the data obtained, complete tables of the results are given in the appendix.

	Miners Average Age	Non Miners Average Age
Data From Wills & Probate Records	54.65	N/a
Nenthead & Garrigill Burials 1850 - 1901	50.52	53.36
Newspaper records 1815 to 1920	51.31	N/A
Alston, Kirkhaugh & Garrigill 1798 - 1812	51.78	54.01

Year Range	Average Age	Sample Size
1850 to 1860	48.79	138
1861 to 1870	46.94	142
1871 to 1880	50.65	124
1881 to 1890	54.67	84
1891 to 1901	59.20	44

**Average age of Miners Buried at St John, Garrigill & St John, Nenthead
1850 to 1901**

All the evidence shows that lead mining was an unhealthy and hazardous occupation, the reports of various commissions of the period, such as "Children's Employment Commission 1st report Mines 1842", by J. Mitchell, Headlam Greenhow's 1858, report into the "Sanitary State of the People of England," and the Kinnaird report of 1864, give ample evidence of this. Fortunately the absence of explosive gases in the Alston mines meant there was not the massive loss of life as happened in coalmines, but accidents did occur resulting in serious injury and all too often loss of life.

The evidence clearly shows that lead miners had a shorter life than those not involved in lead mining in the same district, but there is some evidence to suggest that they had a greater length of life than those in more urban areas.

The incidence of death amongst miners before the age of 40 is higher than that of the general male population but it would be incorrect to state that it was only miners that died at a young age there is adequate evidence to show that early deaths occurred in all occupations and professions.

All data collected shows a very high incidence of child mortality amongst families of all strata's of society, and deaths among women in child birth or due to child birth are also common and again this applies across the full range of society.

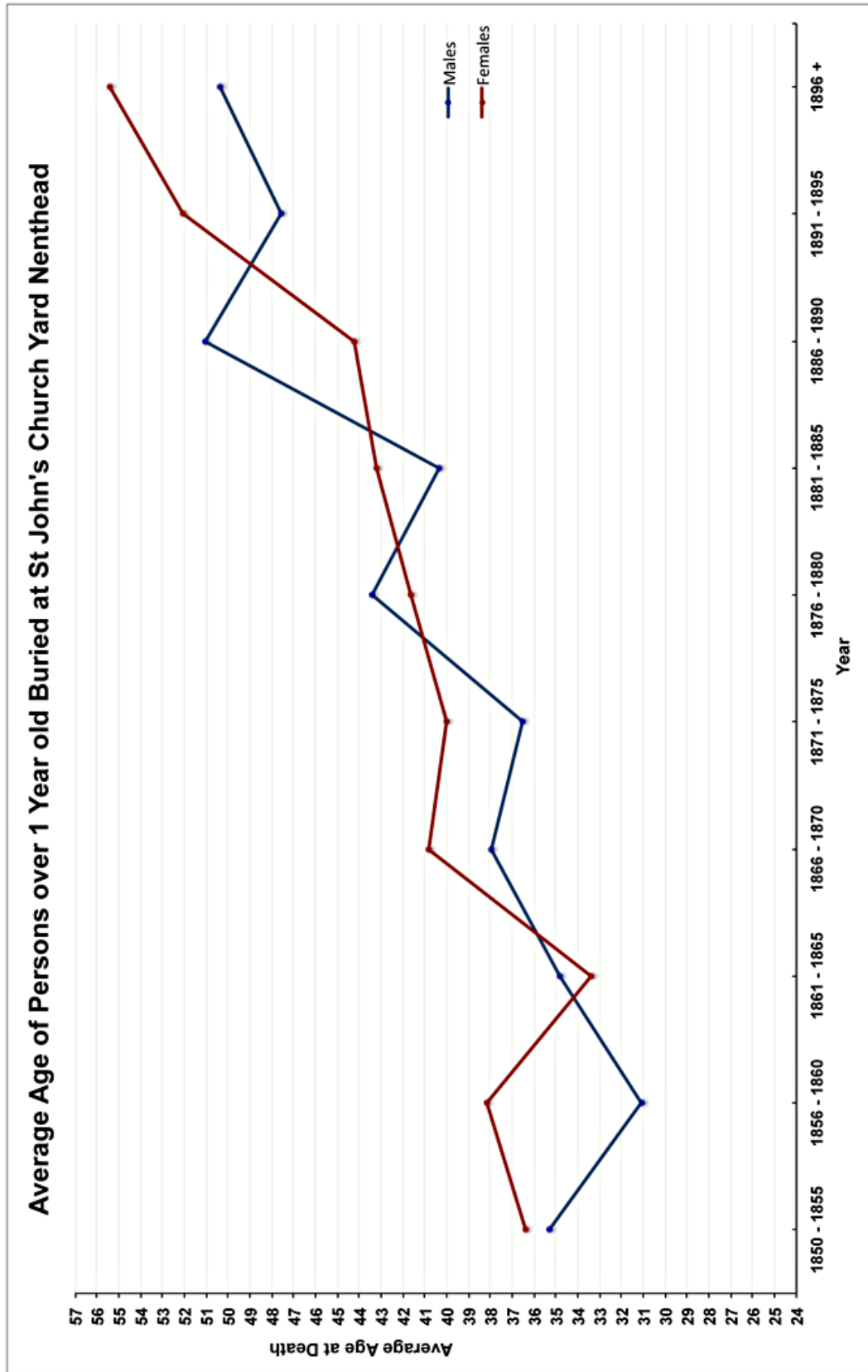


Fig. 9

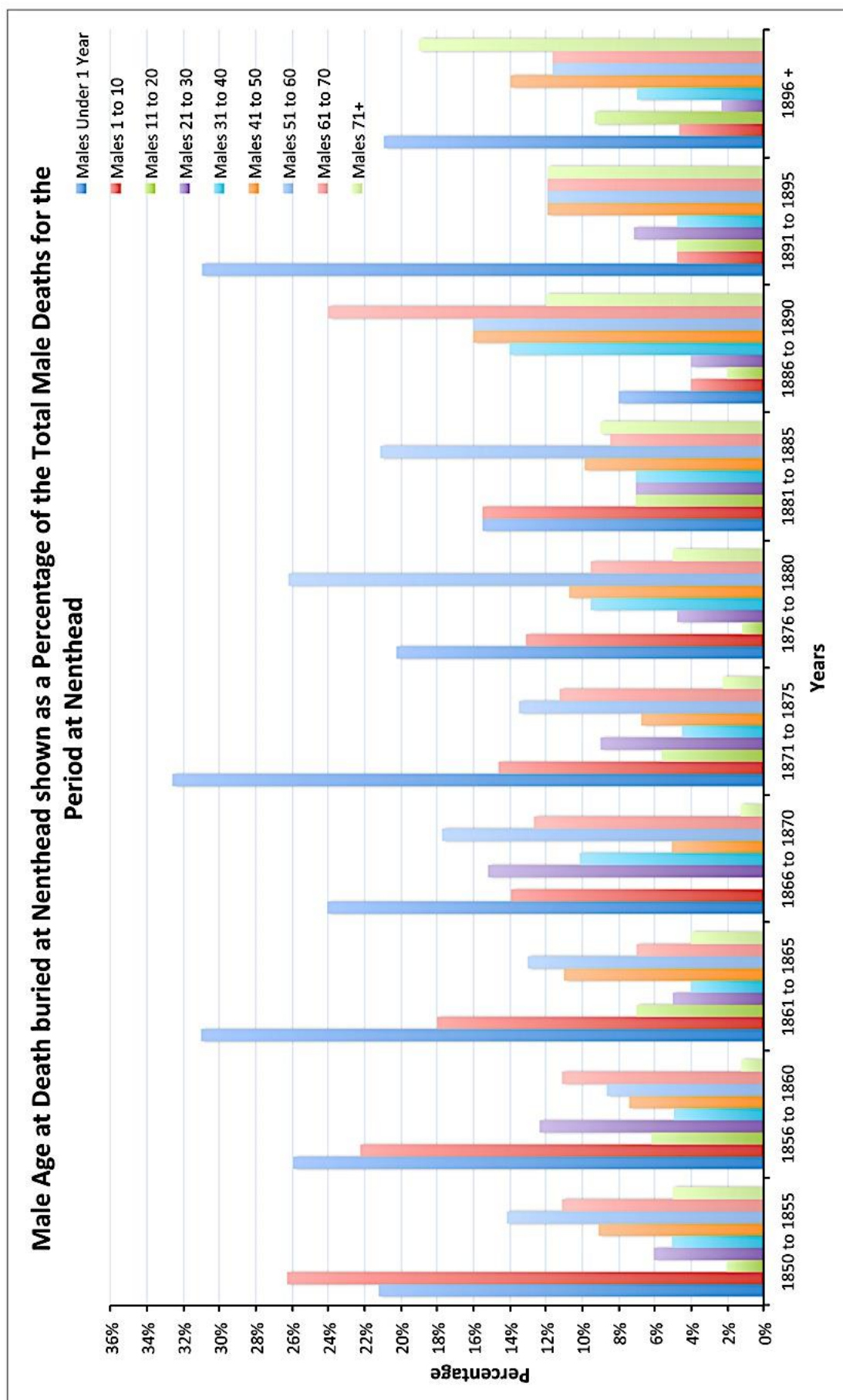


Fig. 10

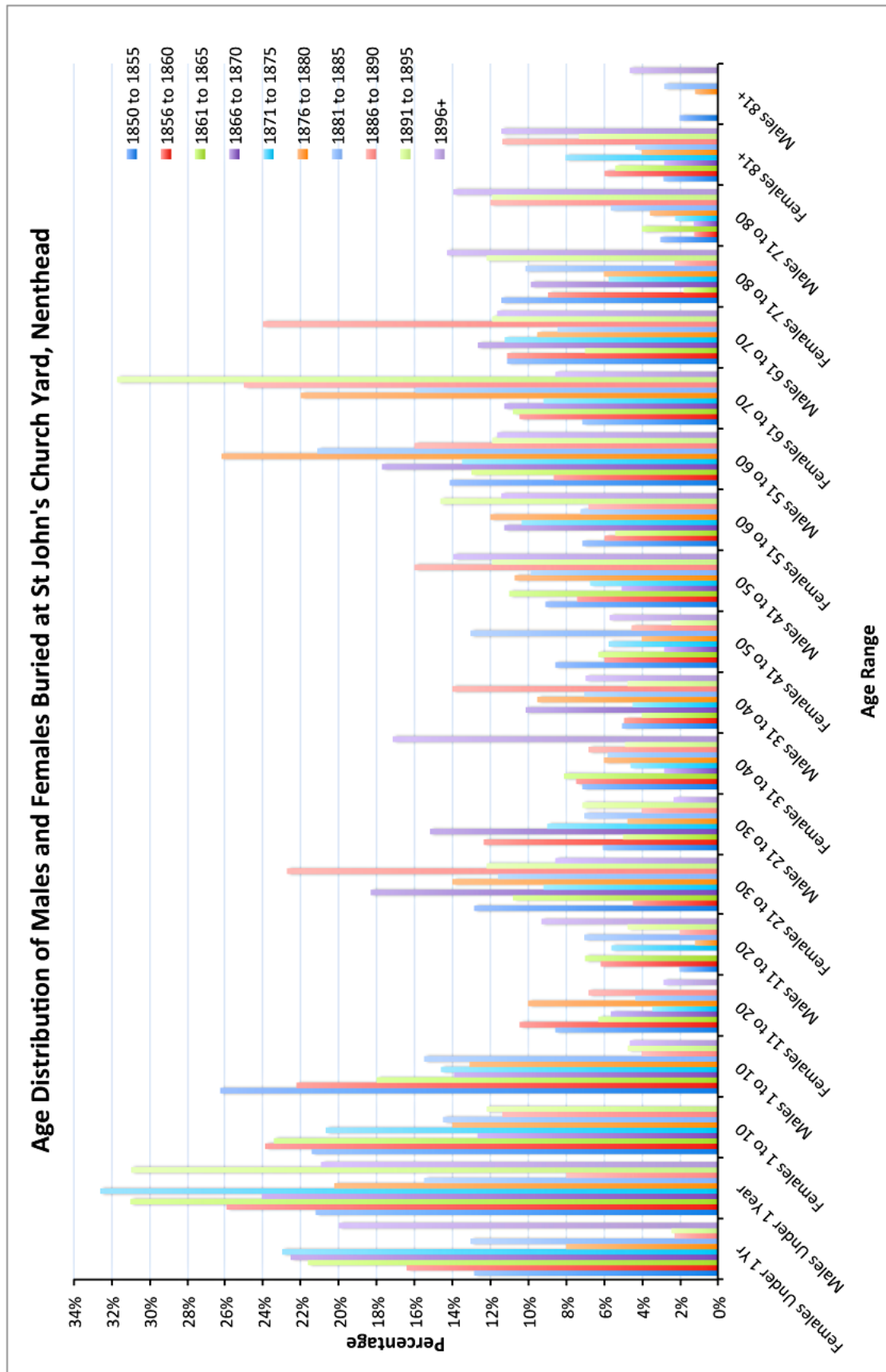
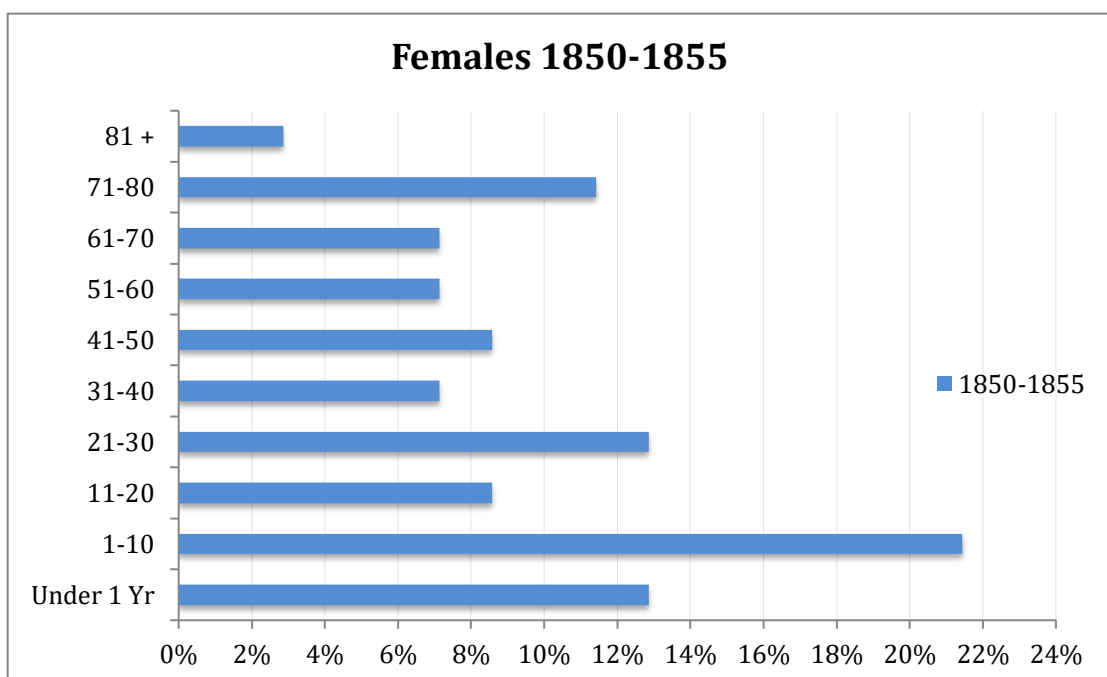
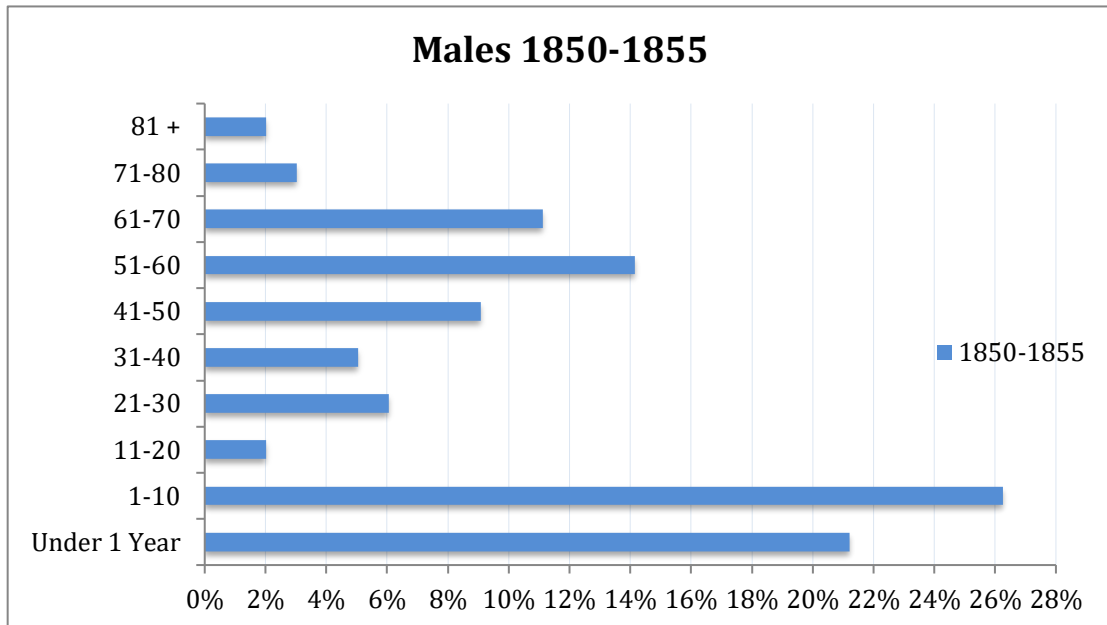


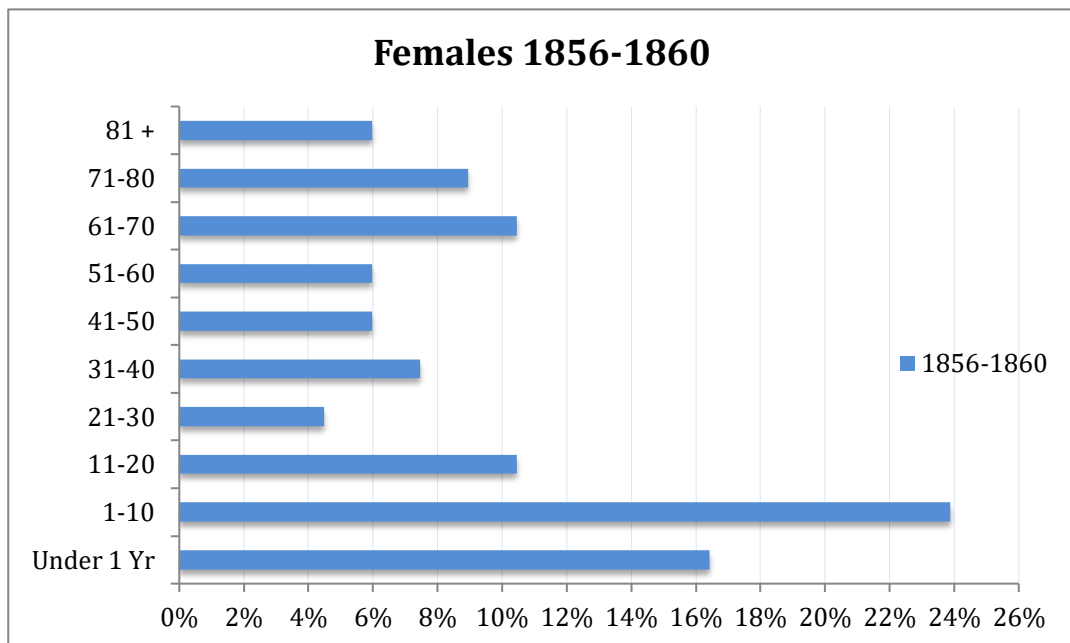
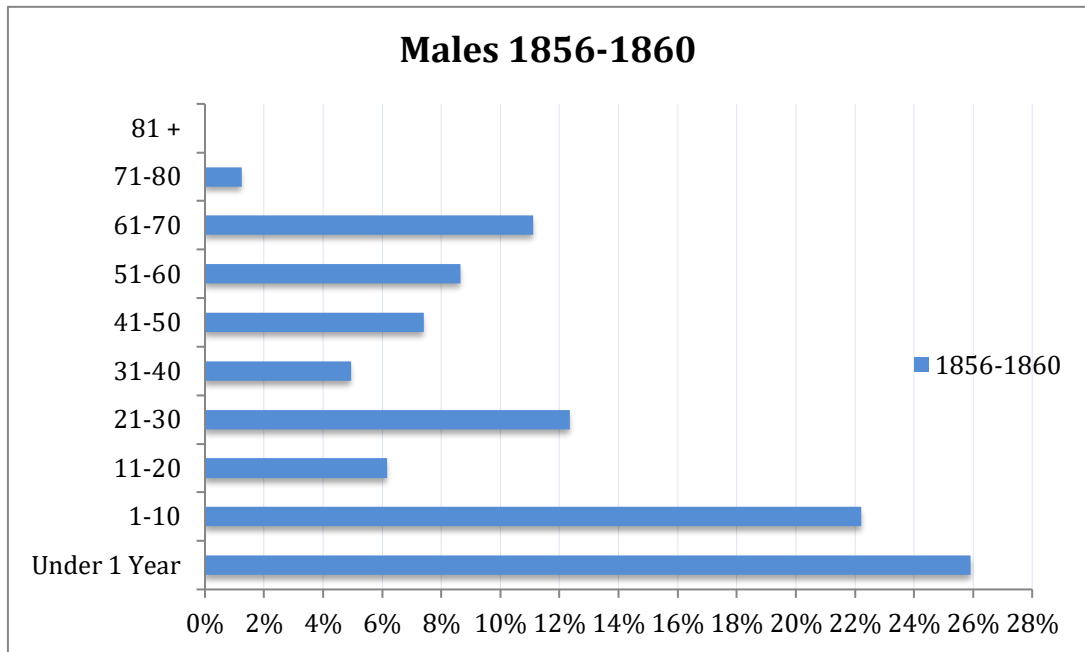
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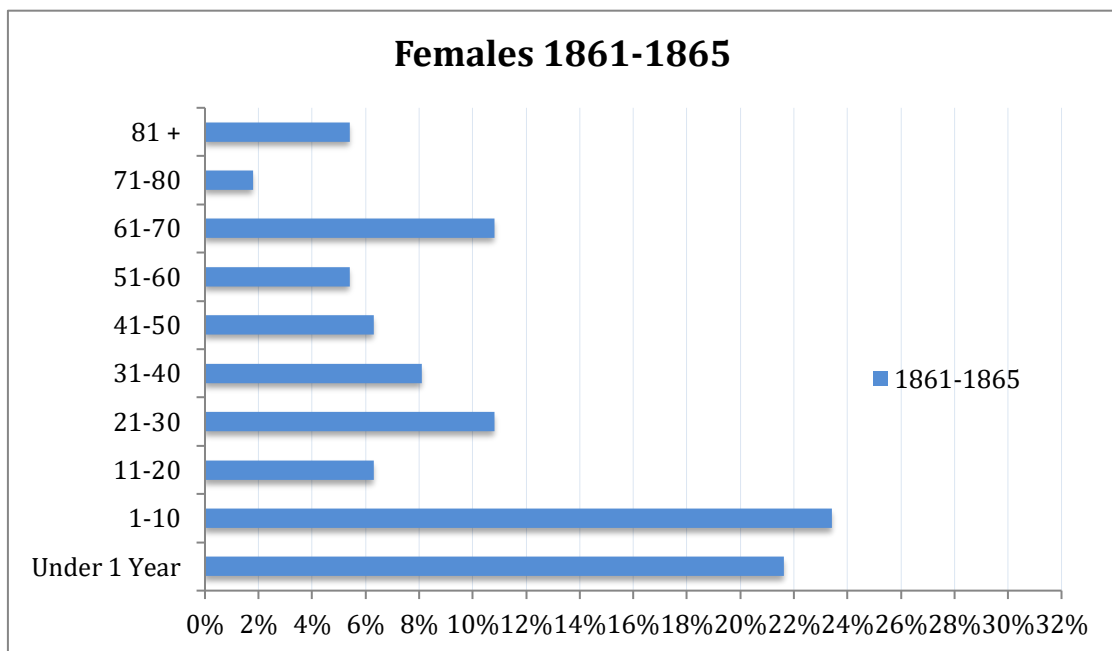
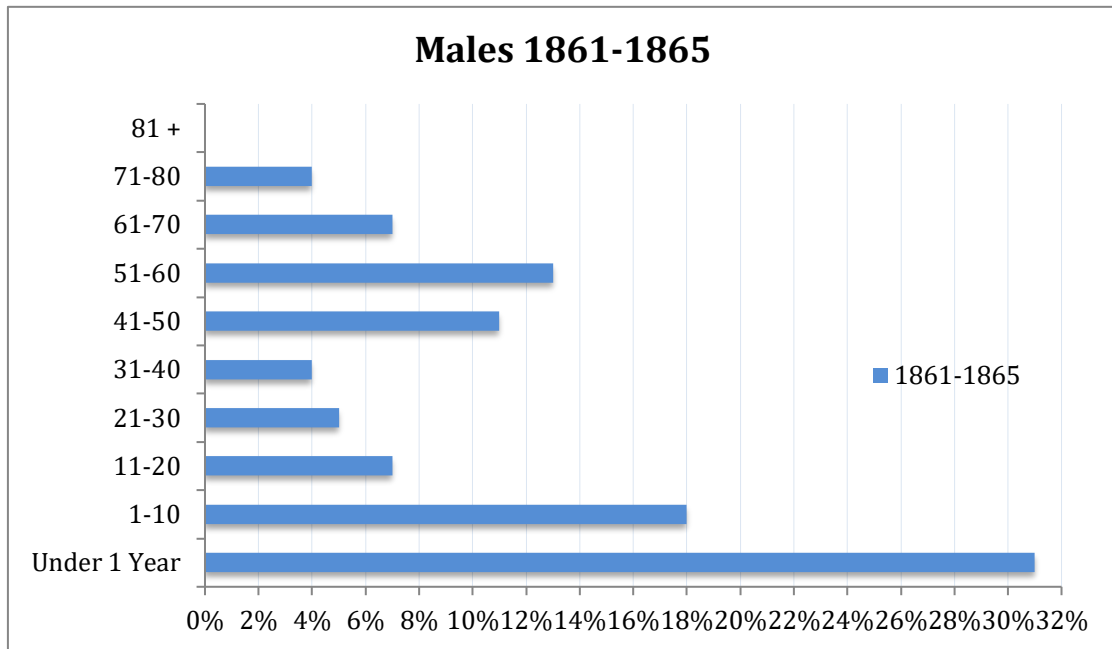
Appendix 1.

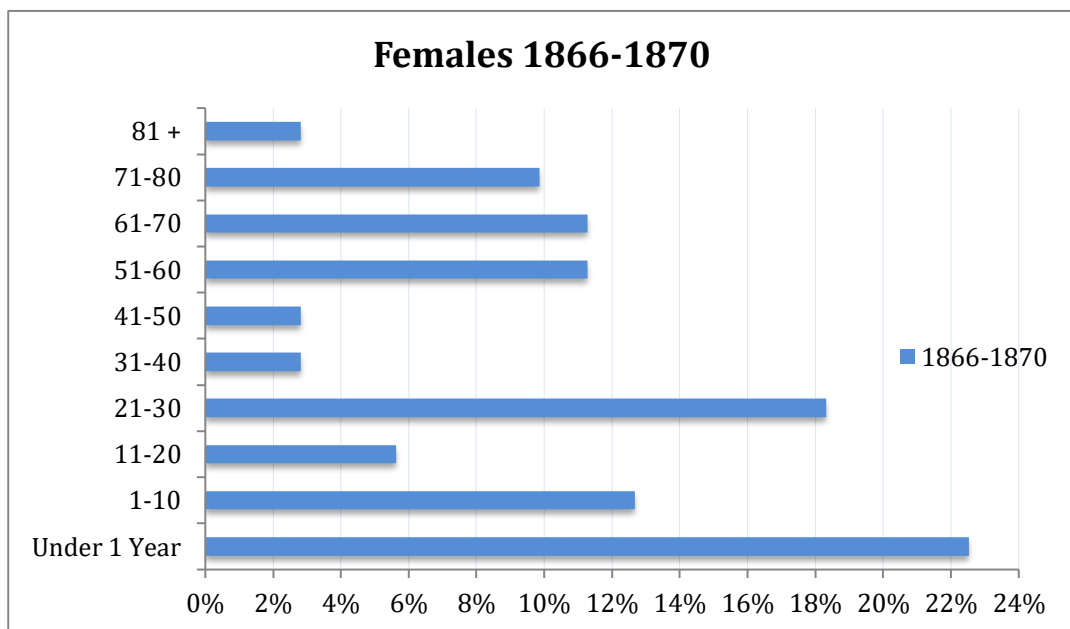
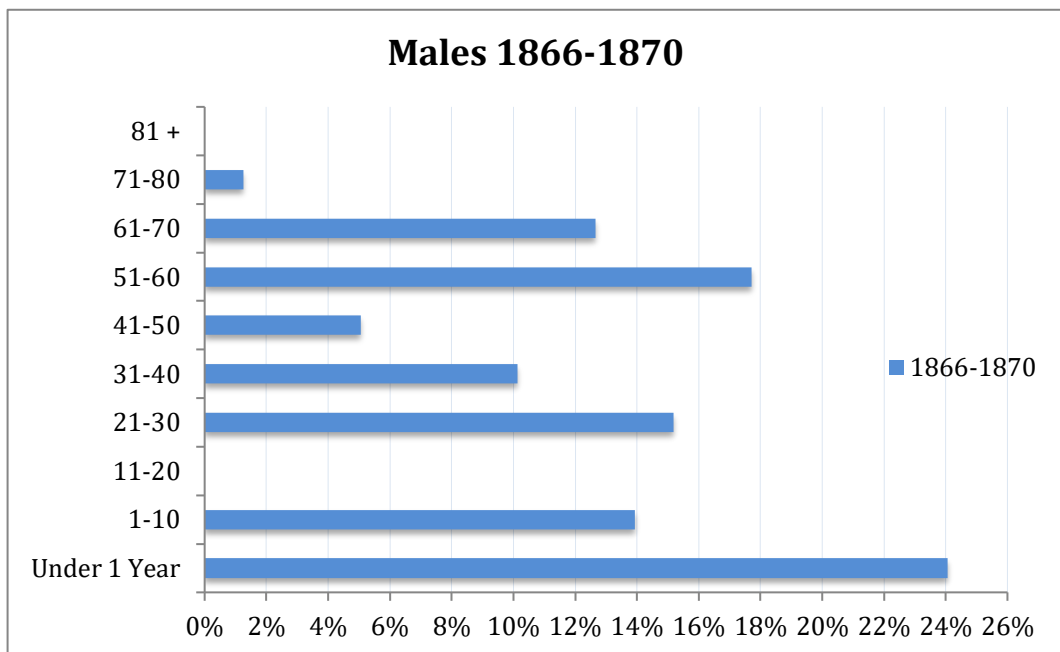
Deaths as a percentage of the total number of deaths for each age group,
St John's Parish, Nenthead.

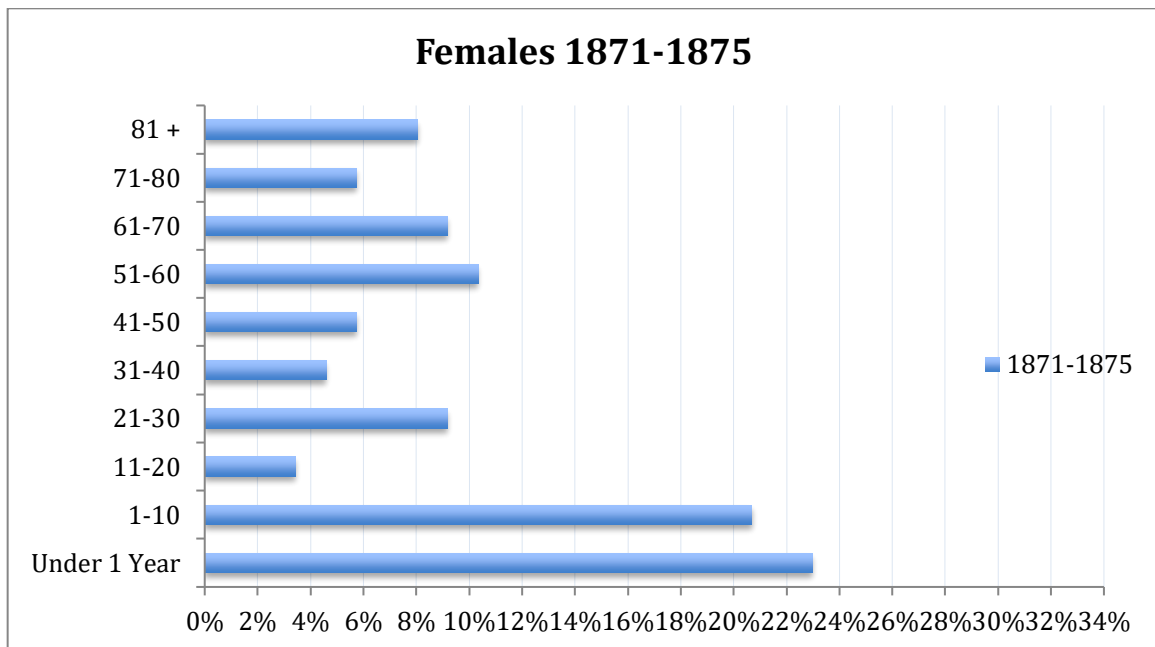
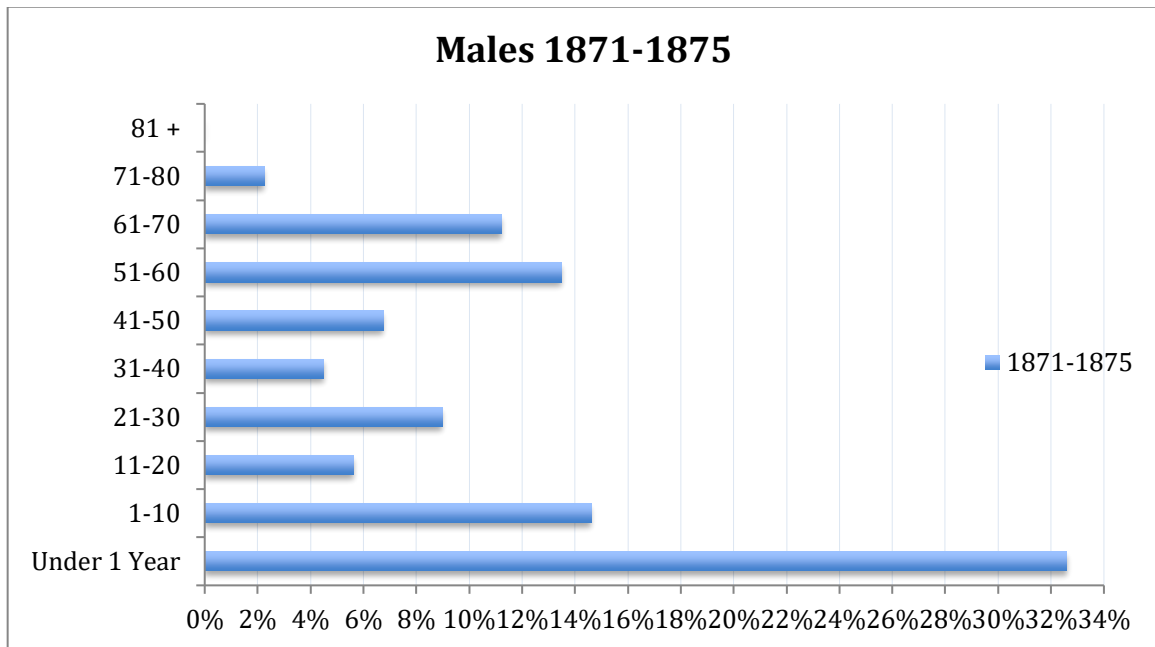
Age Distribution

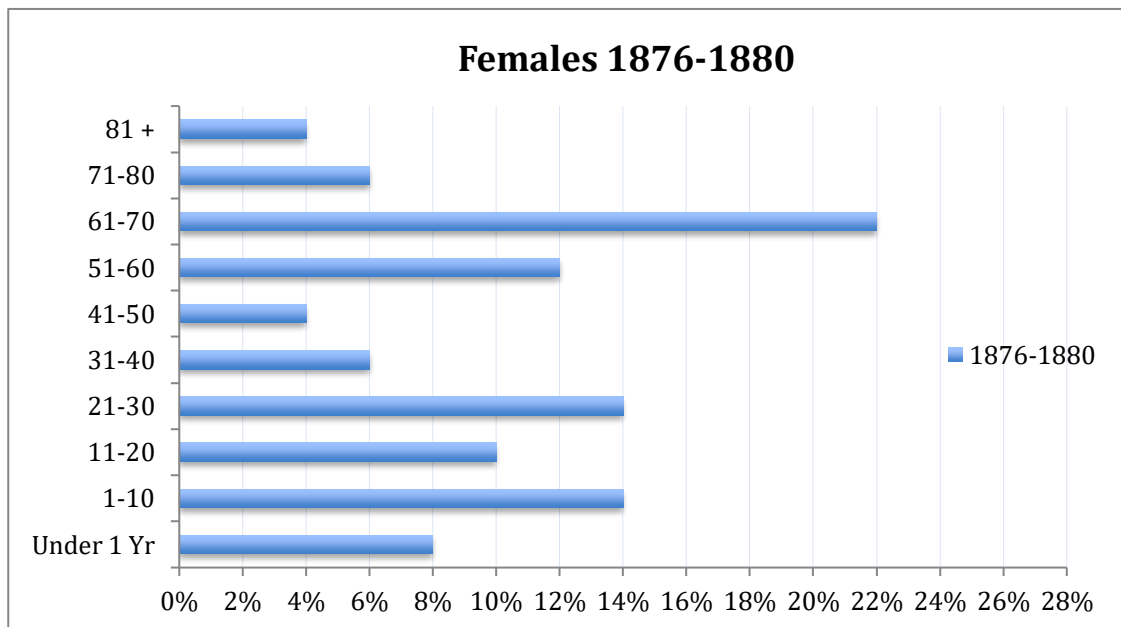
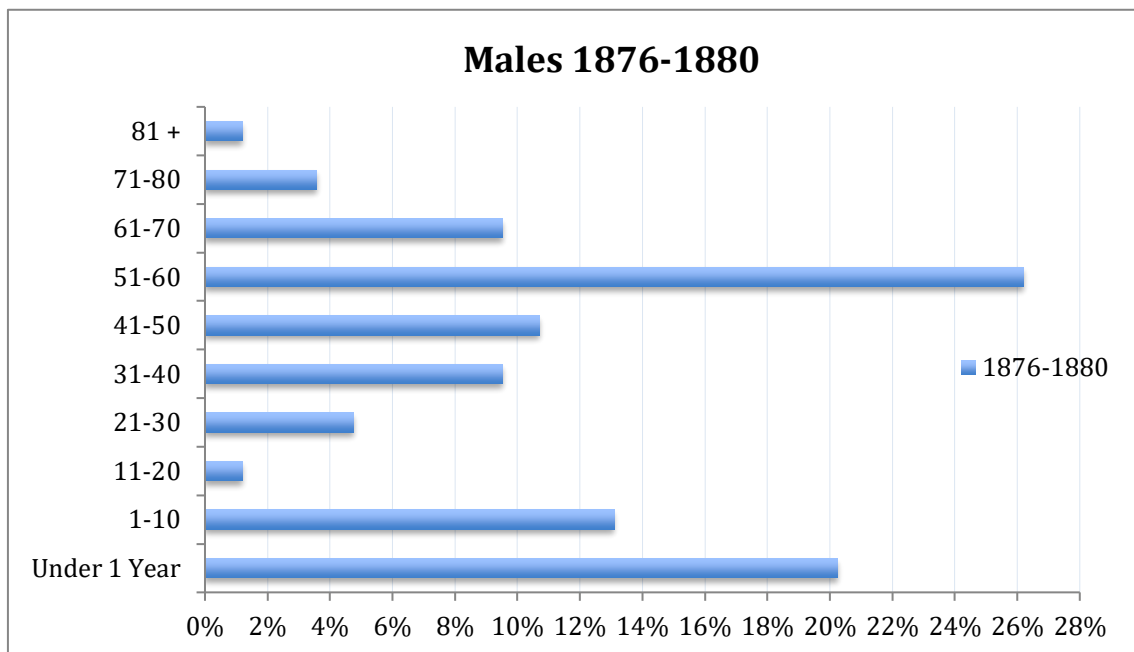


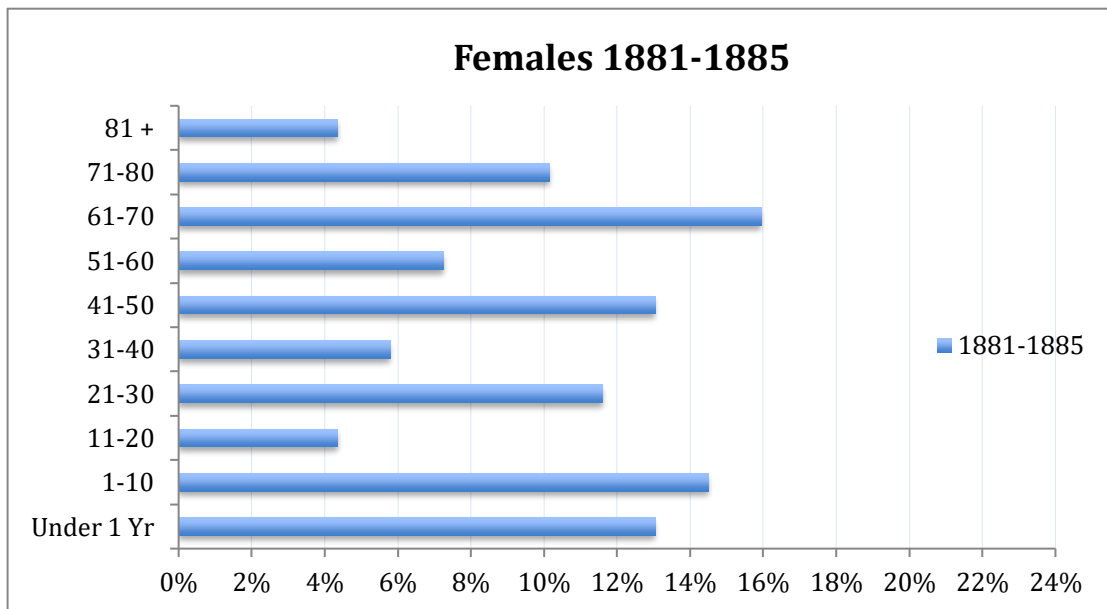
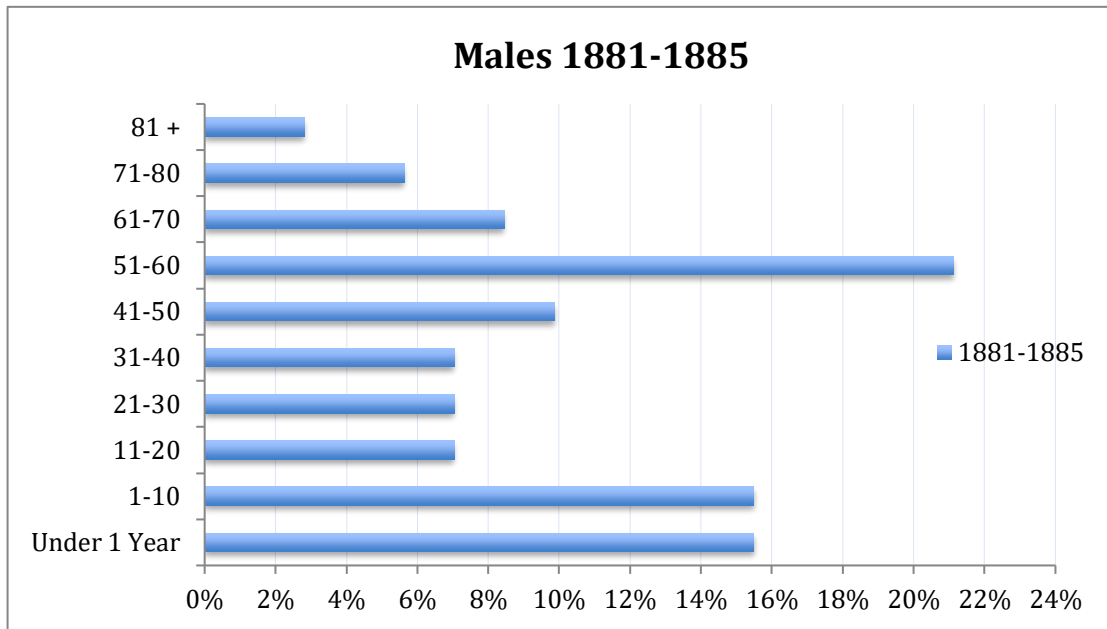


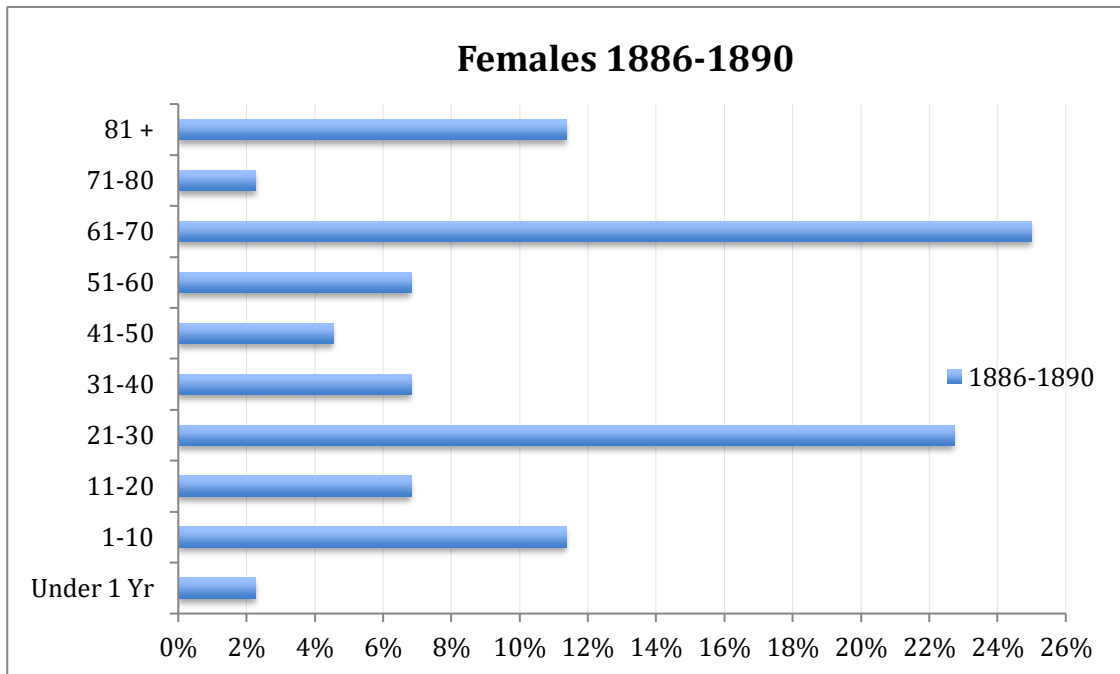
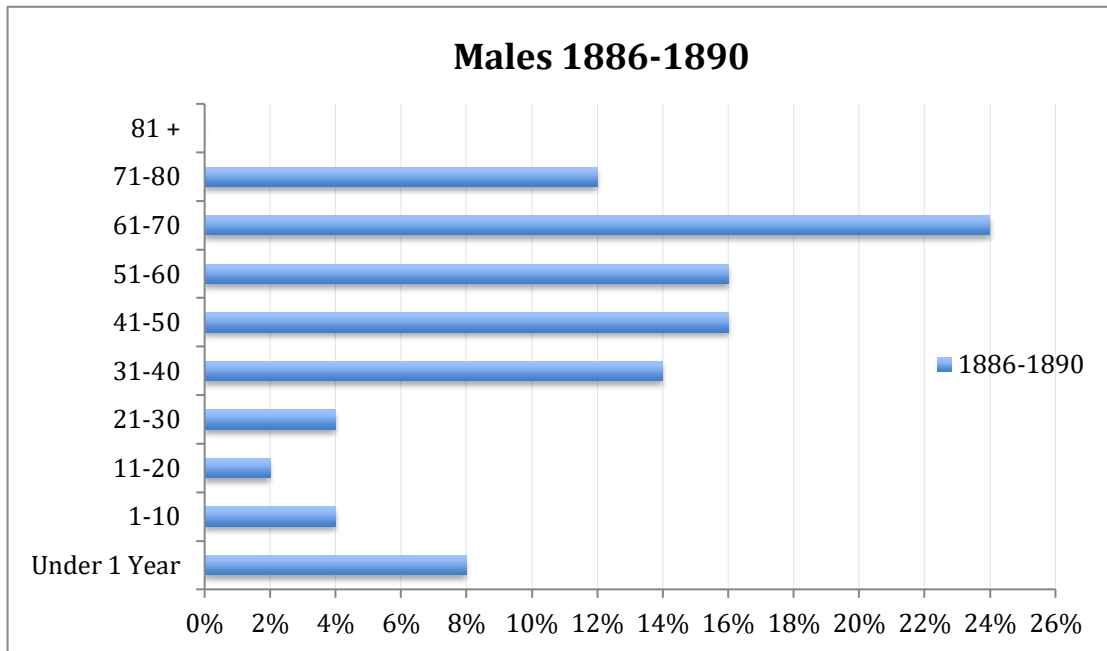


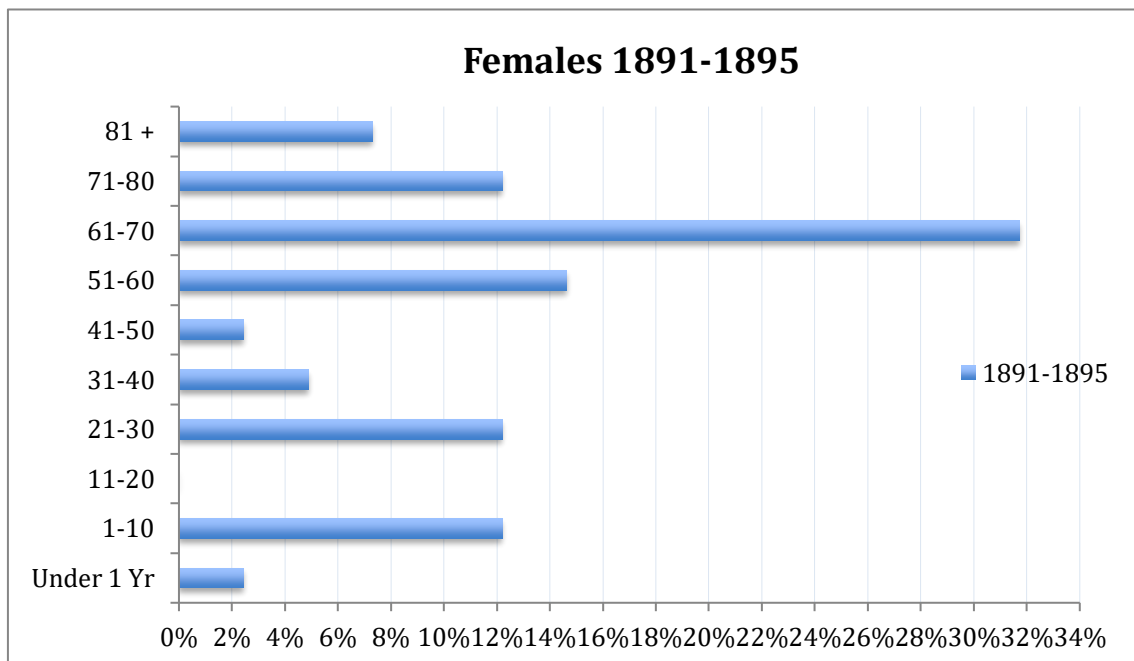
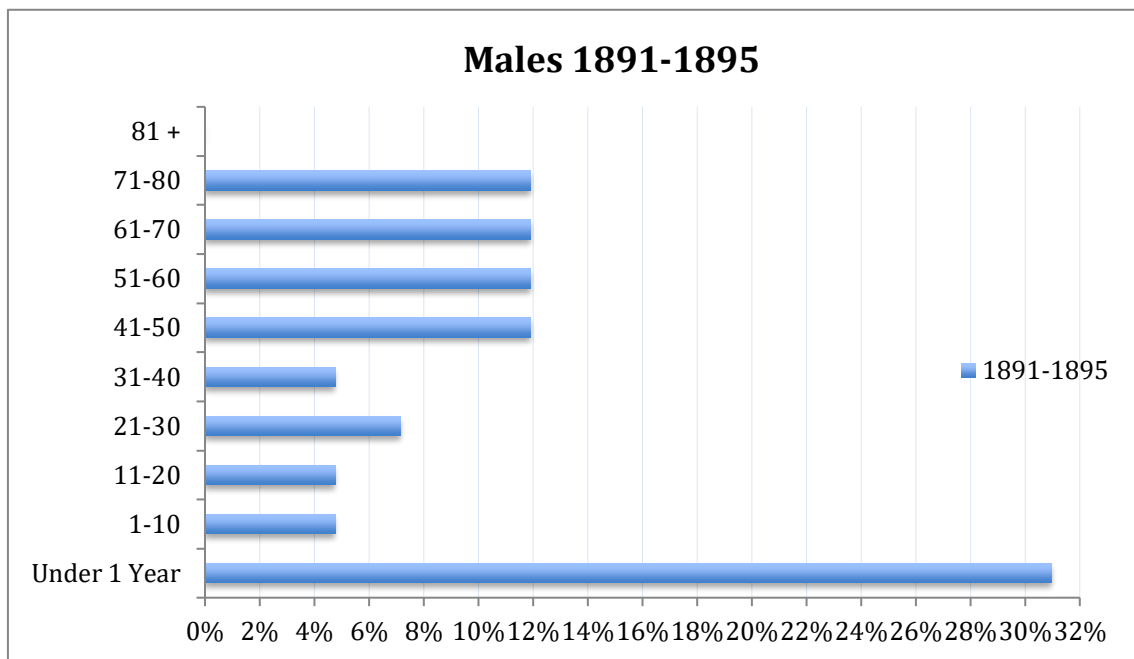


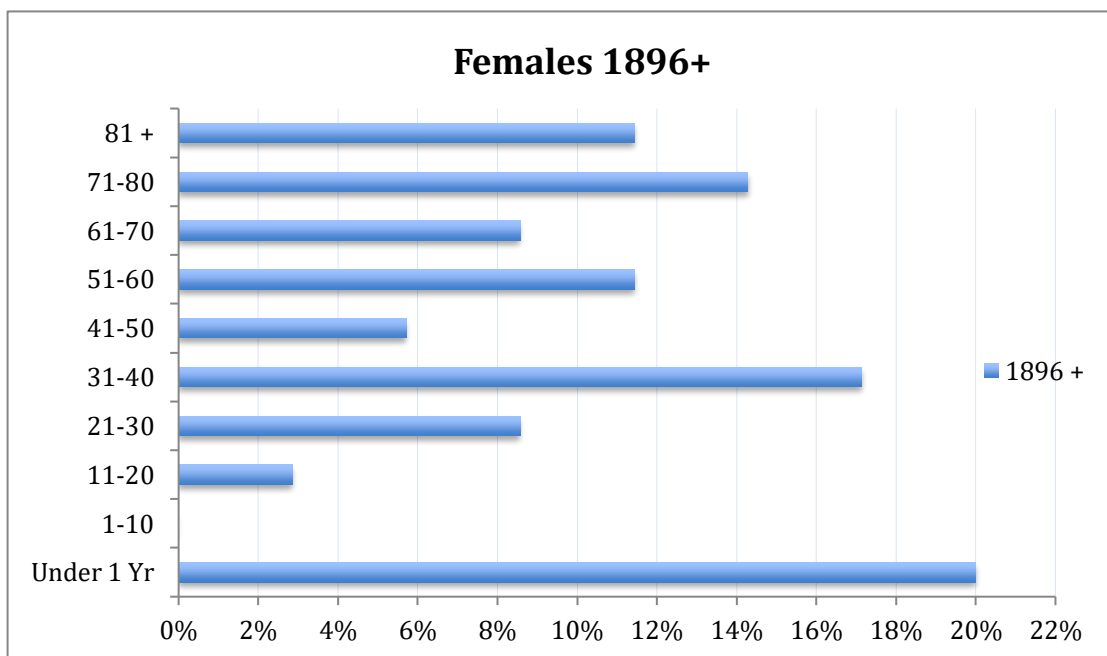
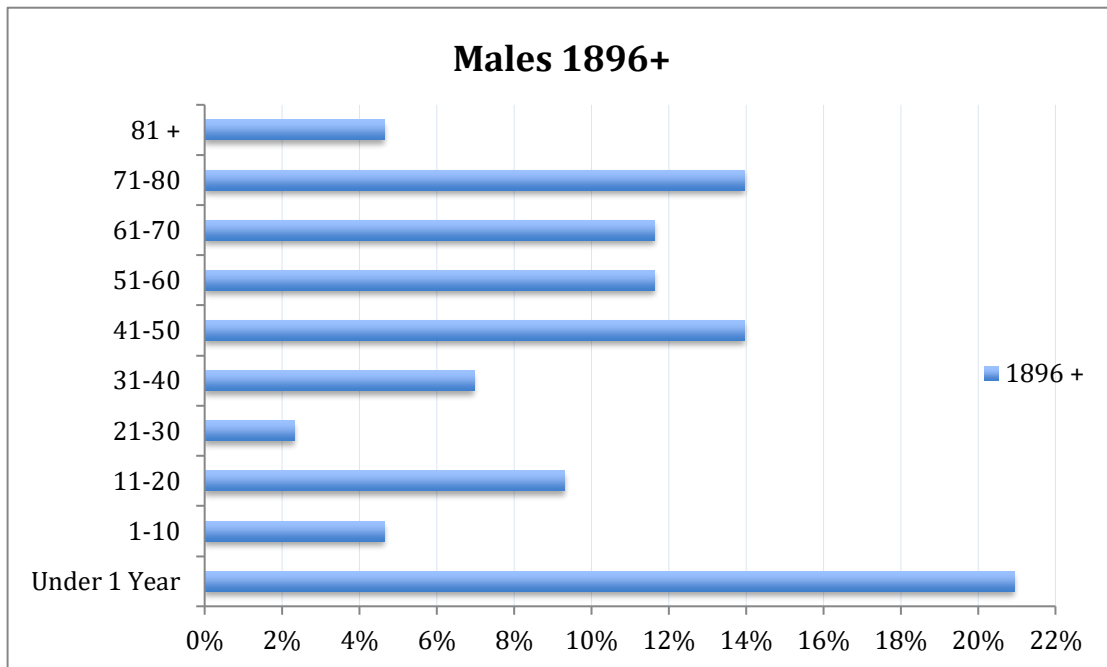












Appendix 2.**Summary of the Information gathered from St John. Nenthead, and St John, Garrigill, Burials, 1850 to 1901**

755 burials were examined of these it was not possible to determine from census records the occupation of 15 (2%) so reducing the size of the group to 740.

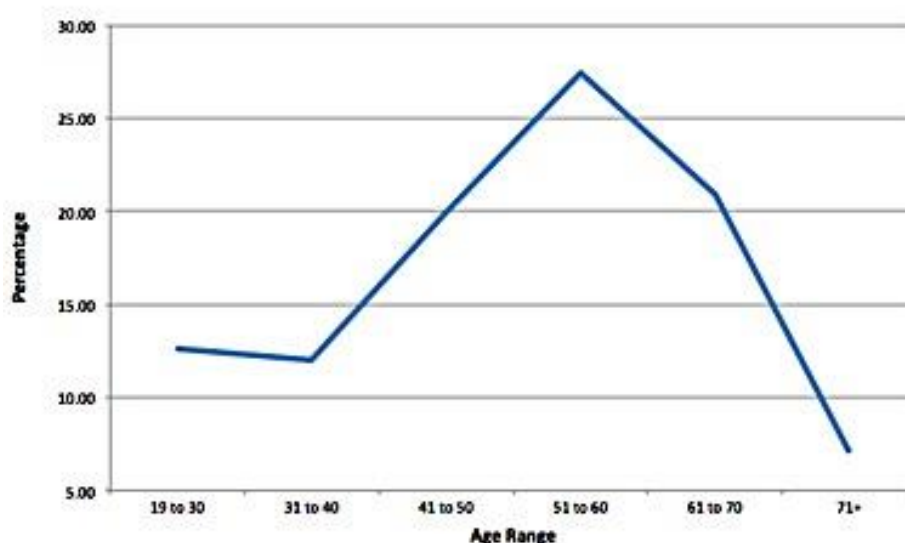
Population Size 740		
Male Working Population Aged 18 and Over Garrigill & Nenthead 1850-1901	Average Age	% of the Survey
Age at Death for All Male occupations	51.45	
Median at Death for All Males occupations	53	
Age at Death Miners excluding Mine Agents	50.52	72%
Median at Death Miners excluding Mine Agents	52	
Age at Death Mine Agents	63	1.10%
Median at Death Mine Agents	59	
Age at death Farmers/Ag Workers	55.43	6.20%
Median at death Farmers/Ag Workers	61	
Age at Death of All males except Miners & Mine Agents	53.36	26.9
Median at Death of All males except Miners & Mine Agents	56	
Average Age Blacksmiths	59.08	1.8
Average Age Innkeeper	58.71	0.95
Average Age Tailor	52.29	0.95
Average Age Grocer/Draper/Merchant	50.36	3
Average Age Carpenter/Joiner/Mason	51.4	2
Average Age Ore dresser/washer	44	2.8
Average Age Smelter	59.3	4.5
Average Age Woodcutter	56	0.7
Average Age Cartman/Carrier	46	0.95
Average Age of other Occupations	51	3.2

Average age of Miners Buried at St John, Garrigill & St John , Nenthead 1850 to 1901	Average Age	Sample Size
1850 to 1855	48.34	76
1856 to 1860	49.34	62
1861 to 1865	45.29	70
1866 to 1870	48.54	72
1871 to 1875	47.90	59
1876 to 1880	53.14	65
1881 to 1885	52.92	48
1886 to 1890	57.00	36
1891 to 1895	52.70	20
1896+	60.46	24
1850 to 1901	50.52	532

Average age of Miners Buried at St John, Garrigill & St John , Nenthead 1850 to 1901	Average Age	Sample Size
1850 to 1860	48.79	138
1861 to 1870	46.94	142
1871 to 1880	50.65	124
1881 to 1890	54.67	84
1891 to 1901	59.20	44

Age at death as a % of all Miners Garrigill 1850 to 1901	Nos	%
19 to 30	67	12.59
31 to 40	64	12.03
41 to 50	106	19.92
51 to 60	146	27.44
61 to 70	111	20.86
71+	38	7.14
Total	532	

Age at death as a % of all Miners Garrigill and Nenthead 1850 to 1901



Appendix 3.
Information Obtained from Newspaper Reports 1815 to 1920

Information From Newspapers		
Number of Miners identified 639	Average Age at Death	
Year	All	18+
1815 to 1840	44.3	48
1841 to 1850	47.3	47.71
1851 to 1860	51.62	51.62
1861 to 1870	48.27	49.35
1871 to 1880	50.68	50.9
1881 to 1890	56.56	56.56
1891 to 1900	57.29	57.92
1900 to 1920	51.06	52.2
1815 to 1920	51.31	51.93

Reported Cause of Death of Miners		
Sample Size 123	Information From Newspapers	
Cause of Death	Number	Percentage
Fall of rock	57	46.34
Blasting Accident	23	18.70
Fell down a shaft	18	14.63
Ore Wagon Accident	8	6.50
Cage accident	6	4.88
Rise collapsed in	3	2.44
Foul Air Asphixia	3	2.44
Not Stated & Other	5	4.07
Total	123	100

Average Age 37.24
Aver Age 18+ 39.35
Median Age 37

Miners 1815 to 1916 where the age is Known

Age Range	% of Total Reported Deaths
11 to 20	14.77
21 to 30	25.00
31 to 40	18.18
41 to 50	15.91
51 to 60	23.86
61+	2.27

Appendix 4.

Information obtained from Wills, Administrations, and Probate Records.

Wills proved at Durham Pre 1858 were searched for evidence of Wills or Administrations for Miners living in the Parish of Alston. Wills and Probate records proved at Carlisle were searched for the same information, in both searches records relating to other occupations were documented when found but not specifically searched for. 656 records were found of these it was possible to determine the occupation for 599 that is 91.3 percent of the total.

Summary of the Data

Average Age at Death All	56.31
Median Age at Death All	56
Average Age of all Miners	54.65
Median Age of all Miners	54
Average age of those only giving Miner as an Occupation	53.26
Median age of those only giving Miner as an Occupation	53
Average Miner/Farmers/Yeomen	61.2
Median Miner/Farmers/Yeomen	60

Occupations Population Size 599	Av Age	Sample Size	%
Miner	54.65	428	71.45
Mine Agent/owner	68.13	16	2.67
Farmer	62.26	27	4.51
Yeoman/Gentleman	59.31	35	5.84
Draper/Grocer/Tailor/Ironmonger/Clogger	53.8	15	2.5
Smelter	61	12	2.00
Blacksmith	47.78	9	1.50
Ore Washer/Dresser	67.75	8	1.34
Innkeeper	55.8	6	1.00
Mason/Joiner	58.5	4	0.67
No Occupation listed & Others	61.9	39	6.51

Average age of All Miners	Av Age	Sample Size 428	%
Pre 1800	50.77	47	10.98
1801 to 1810	54.56	36	8.41
1811 to 1820	51.74	31	7.24
1821 to 1830	50.31	29	6.78
1831 to 1840	48.21	14	3.27
1841 to 1850	50.67	43	10.05
1851 to 1860	57.09	44	10.28
1861 to 1870	55.89	56	13.08
1871 to 1880	53.08	38	8.88
1881 to 1890	56.21	38	8.88
1891 to 1900	62	20	4.67
1901 to 1910	66.27	22	5.14
1911+	63.9	10	2.34

Average age of those giving Miner as the only Occupation	Av Age	Sample Size 353	%
Pre 1800	51.39	46	13.03
1801 to 1810	54.52	31	8.78
1811 to 1820	49.64	25	7.08
1821 to 1830	48.32	28	7.93
1831 to 1840	47.81	11	3.12
1841 to 1850	49.16	37	10.48
1851 to 1860	57.55	38	10.76
1861 to 1870	54.75	44	12.46
1871 to 1880	51.03	31	8.78
1881 to 1890	54.62	26	7.37
1891 to 1900	60	15	4.25
1901 to 1910	62.5	14	3.97
1911+	62	7	1.98

Appendix 5.

Summary of the information obtained from the Burial Registers of Alston, Kirkhaugh and Garrigill 1798 to 1812.

The burials for Alston, Kirkhaugh and Garrigill for the period 1798 to 1812 have been combined to create the combined population size of 1335. During this period the registers included when known the occupation of the deceased.

Alston, Garrigill & Kirkhaugh 1798 to 1812	Average Age
Average Age at Death for All Males & Females*	35.20
Average Age at Death for All Males & Females 18 and over*	54.57
Average Age at Death for All Males & Females 17 & under	3.56
Median at Death for All Males & Females*	35.00
Median at Death for All Males & Females 18 and over	55.00
Median at Death for All Males & Females 17 & under	2.00
Average Age at Death for All Females	36.38
Average Age at Death for All Females 18 and over	56.78
Average Age at Death for All Females 17 & under	3.97
Median at Death for All Females	33.50
Median at Death for All Females 18 and over	60.00
Median at Death for All Females 17 & under	2.00
Average Age at Death for All Wives	46.17
Median at Death for All Wives	44.00
Average Age at Death for All Males*	34.24
Average Age at Death for All Males 18 and over*	52.81
Average Age at Death for All Males 17 & under	3.22
Median at Death for All Males*	36.00
Median at Death for All Males 18 and over*	53.00
Median at Death for All Males 17 & under	2.00
Average Age at Death Miners 18 and over	51.78
Median at Death Miners 18 and over	52.00
Average Age at death Farmers/Yeomen/Gentlemen	62.80
Median at death Farmers/Yeomen/Gentlemen	62.00
Average Age at Death of All males 18 & over except miners*	54.01
Median at Death of All males 18 & over except miners*	57.00
Average Age at death for Tradesmen & Professional occupations	56.99
Median at death for Tradesmen & Professional occupations	58

*These figures include burials where occupation was not given

Alston, Garrigill & Kirkhaugh 1798 to 1812

Average Age	Average Age
Average Age Blacksmiths	57.33
Average Age Innkeeper	49.75
Average Age Shoemaker/Clogger	57.4
Average Age Tailor	76.5
Average Age Schoolmaster	49.5
Average Age Grocer/Draper/Butcher/Merchant	55.3
Average Age Carpenter/Joiner/Mason	60.44

Average Age at Death Alston, Kirkhaugh & Garrigill 1798 to 1812		
Population Size	248	138
Year Range	Miners	Non Miners
Pre 1801	49.24	58.88
1801 to 1805	54.00	62.00
1806 to 1810	49.98	54.88
1811+	51.82	59.83
1789 to 1812	51.78	59.00

Age at death as a % of all Miners	Nos	%
19 to 30	26	10.50
31 to 40	38	15.32
41 to 50	52	21.00
51 to 60	64	25.81
61 to 70	32	12.90
71+	36	14.52

Appendix 6. Medical Terms

Diphtheria

An acute respiratory infection caused by the bacteria *Corynebacterium diphtheriae*, it was a major cause of death in children.

Dropsy

An old term for Oedema (swelling of soft tissue due to the accumulation of excess water) or congestive heart failure (causes oedema), the swelling is most common in the lower legs and feet. Severe respiratory disease can cause right ventricular failure, which will result in Oedema.

Enteric Fever

A group of illnesses associated with enteric (intestines) symptoms caused by salmonellae bacteria, especially typhoid fever and paratyphoid fever, common in areas where sanitation is poor. Symptoms, fever, abdominal pain, and constipation, leading to death.

Hydrocephalus

An accumulation of cerebrospinal fluid within the ventricles or subarachnoid spaces of the brain. The term means water on the brain.

Miner's Asthma

Pneumoconiosis a form of severe bronchitic disease, in consequence of the dust in the atmosphere breathed by the miners.

The term miner's asthma was first used in 1822. The cause of the spitting, coughing, and breathlessness in coal miners was unknown, so doctors used the word asthma to identify the condition. Later, silicosis became known as the disease producing breathlessness in miners who had worked where silica was thought to be in the coal mine dust. [Medicinenet].

Phthisis

An old term for tuberculosis.

Consumption; pulmonary consumption, or decline; emaciation of the body, and debility, attended with a cough, hectic fever (A daily recurring fever with profound sweating, chills, and flushed appearance), and generally purulent expectoration.

Puerperal Fever

Childbed fever, peritoneal fever, a septic infection (the bacteria *Haemolytic Streptococci*) following childbirth, Puerperal infection is most commonly of the interior of the uterus after separation of the placenta.

Pulmonary Disease

Lung disease common terms today would be emphysema, bronchitis, asthma, COPD (Chronic obstructive pulmonary disease), etc.

Scarlatina

Scarlet fever; a disease caused by *Streptococcus* bacteria, symptoms are a fever, fine pink-red rash that feels like sandpaper to touch, sore throat, nausea, red and

swollen tongue and flushed cheeks. In its worst form it may result in Meningitis, Liver damage, Kidney damage, Acute rheumatic fever and death.

Scrofula

A tuberculosis infection producing glandular tumours, chiefly in the neck; that was most common in children, caused by drinking unpasteurised milk from infected cows.

Simple Continued Fever

A fever lasting four to seven days with no specific or apparent cause.

Tabes Mesenterica

Tuberculosis of the lymph glands of the mesentery in the abdomen, resulting in a hectic fever and emaciation of the body, thought like Scrofula to be caught by drinking unpasteurised milk.

Zymotic Disorder

A term formerly applied to acute infectious illnesses e.g. typhus and typhoid fevers, smallpox, scarlet fever, measles, cholera, whooping-cough, diphtheria, &c.

Appendix 7

Simplified Cause of Death Tables for all ages, for Alston Poor Law Registration Union, Newcastle upon Tyne Poor Law Registration District & Cumberland Poor Law Registration County 1851 to 1910.

Source: A Vision of History Through Time

Data for 01 Jan 1851 to 31 Dec 1860	Alston P.L.U.	Cumberland P.L.R.C.	Newcastle P.L.R.D
Cause of Death (Simplified)	Percentage	Percentage	Percentage
Respiratory TB	15.4%	12.5%	10.2%
Other TB	3.3%	3.4%	5.6%
Typhus & Typhoid	2.6%	2.8%	3.6%
Scarlet Fever	1.5%	4.6%	3.9%
Gastro-intestinal	1.7%	3.3%	10.3%
Smallpox	0.2%	0.8%	1.5%
Whooping Cough	2.1%	1.8%	2.7%
Measles	2.0%	1.6%	1.9%
Diphtheria	0.2%	0.3%	0.1%
Lungs	21.7%	9.9%	12.8%
Cancer	0.5%	1.5%	1.3%
Childbirth	0.6%	0.8%	0.7%
Violence	2.5%	3.8%	3.7%
Other	45.7%	52.8%	41.7%

Data for 01 Jan 1861 to 31 Dec 1870	Alston P.L.U.	Cumberland P.L.R.C.	Newcastle P.L.R.D
Cause of Death (Simplified)	Percentage	Percentage	Percentage
Respiratory TB	10.6%	12.4%	10.5%
Other TB	3.7%	3.4%	6.1%
Typhus & Typhoid	1.5%	4.0%	4.5%
Scarlet Fever	5.4%	4.0%	6.2%
Gastro-intestinal	4.7%	3.7%	5.3%
Smallpox	0.2%	0.8%	0.9%
Whooping Cough	2.8%	2.3%	2.8%
Measles	1.1%	2.0%	1.8%
Diphtheria	1.6%	0.8%	0.5%
Lungs	22.5%	11.8%	13.1%
Cancer	1.7%	1.8%	1.4%
Childbirth	0.7%	0.7%	0.7%
Violence	2.1%	3.9%	4.0%
Other	41.3%	48.5%	42.2%

Data for 01 Jan 1871 to 31 Dec 1880	Alston P.L.U.	Cumberland P.L.R.C.	Newcastle P.L.R.D
Cause of Death (Simplified)	Percentage	Percentage	Percentage
Respiratory TB	12.8%	10.2%	9.9%
Other TB	3.0%	3.8%	5.1%
Typhus & Typhoid	1.5%	2.4%	2.3%
Scarlet Fever	1.6%	3.8%	4.9%
Gastro-intestinal	3.0%	3.5%	5.6%
Smallpox	0.3%	1.1%	2.3%
Whooping Cough	1.2%	2.1%	2.3%
Measles	1.5%	2.0%	1.2%
Diphtheria	2.1%	0.5%	0.4%
Lungs	21.4%	15.5%	14.9%
Cancer	2.5%	2.3%	1.8%
Childbirth	0.7%	0.9%	0.8%
Violence	2.3%	4.2%	4.5%
Other	46.1%	47.7%	44.1%

Data for 01 Jan 1881 to 31 Dec 1890	Alston P.L.U.	Cumberland P.L.R.C.	Newcastle P.L.R.D
Cause of Death (Simplified)	Percentage	Percentage	Percentage
Respiratory TB	9.4%	9.7%	10.1%
Other TB	5.3%	3.9%	4.5%
Typhus & Typhoid	0.4%	1.0%	1.4%
Scarlet Fever	1.6%	1.4%	1.8%
Gastro-intestinal	0.7%	2.8%	4.3%
Smallpox	0.0%	0.0%	0.4%
Whooping Cough	1.5%	2.4%	2.3%
Measles	0.4%	2.6%	2.8%
Diphtheria	0.1%	0.5%	0.6%
Lungs	15.0%	20.3%	16.5%
Cancer	3.5%	3.7%	2.7%
Childbirth	0.5%	0.9%	0.8%
Violence	2.9%	4.6%	4.0%
Other	58.7%	55.9%	47.9%

Data for 01 Jan 1891 to 31 Dec 1900	Alston P.L.U.	Cumberland P.L.R.C.	Newcastle P.L.R.D
Cause of Death (Simplified)	Percentage	Percentage	Percentage
Respiratory TB	7.8%	7.4%	9.8%
Other TB	2.7%	3.3%	4.4%
Typhus & Typhoid	0.2%	0.5%	0.5%
Scarlet Fever	1.7%	1.2%	0.5%
Gastro-intestinal	1.8%	2.0%	3.5%
Smallpox	0.0%	0.0%	0.0%
Whooping Cough	1.7%	2.0%	2.5%
Measles	0.5%	2.9%	3.0%
Diphtheria	1.2%	0.6%	0.8%
Lungs	9.2%	17.2%	16.4%
Cancer	4.8%	4.6%	4.0%
Childbirth	1.0%	1.0%	0.8%
Violence	2.8%	4.0%	4.7%
Other	64.7%	53.4%	49.2%

Data for 01 Jan 1901 to 31 Dec 1910	Alston P.L.U.	Cumberland P.L.R.C.	Newcastle P.L.R.D
Cause of Death (Simplified)	Percentage	Percentage	Percentage
Respiratory TB	8.5%	6.7%	8.8%
Other TB	3.8%	3.5%	4.2%
Typhus & Typhoid	0.2%	0.4%	0.1%
Scarlet Fever	0.6%	0.6%	0.3%
Gastro-intestinal	0.6%	1.6%	3.1%
Smallpox	0.0%	0.0%	0.1%
Whooping Cough	0.9%	1.7%	2.2%
Measles	0.4%	1.6%	1.9%
Diphtheria	0.2%	0.9%	0.6%
Lungs	10.9%	15.7%	15.9%
Cancer	7.5%	6.1%	5.8%
Childbirth	0.8%	0.8%	0.6%
Violence	2.8%	4.0%	4.5%
Other	62.8%	56.1%	51.8%

Appendix 8. Cause of Death Tables (full) for all ages, for Alston Poor Law Registration Union, Newcastle upon Tyne Poor Law Registration District & Cumberland Poor Law Registration County 1851 to 1910.

Source: A Vision of History Through Time

Data for 01 Jan 1851 to 31 Dec 1860:	Alston P.L.U.	Cumberland P.L.R.C	Newcastle P.L.R.D.
Cause of Death (RG 1850s DS definition)	Percentage	Percentage	Percentage
Small-pox	0.3%	0.5%	0.7%
Measles	0.0%	0.1%	0.0%
Scarlatina	0.3%	0.8%	0.3%
Diphtheria	0.0%	0.1%	0.0%
Whooping-cough	0.0%	0.0%	0.0%
Typhus	3.4%	4.7%	5.2%
Cholera, Diarrh., Dysentery	1.4%	2.0%	12.0%
Other Zymotic Dis.	2.4%	3.3%	2.4%
Cancer	0.8%	2.9%	2.8%
Scrofula, Tabes Mesent.	1.7%	1.0%	1.0%
Phthisis	28.8%	31.8%	26.0%
Hydrocephalus	0.3%	0.2%	0.0%
Diseases of Brain	8.6%	8.2%	7.8%
Heart Dis. & Dropsy	8.6%	10.0%	9.9%
Dis. of Lungs	24.1%	8.8%	10.5%
Dis. of Stom. & Liver	9.2%	7.6%	6.8%
Dis. of Kidneys	1.5%	1.6%	1.7%
Dis. of Gener. Organs	1.0%	0.6%	0.6%
Dis. of the Joints	0.8%	0.7%	0.7%
Dis. of the Skin	0.2%	0.2%	0.1%
Childbirth & Metria	1.4%	2.3%	1.9%
Violent Deaths	3.4%	6.4%	6.3%
Other Causes	1.7%	6.2%	3.6%

Data for 01 Jan 1861 to 31 Dec 1870:	Alston P.L.U.	Cumberland P.L.R.C	Newcastle P.L.R.D.
Cause of Death (RG 1860s DS definition)	Percentage	Percentage	Percentage
Small-pox	0.2%	0.8%	0.7%
Measles	0.2%	0.1%	0.0%
Scarlatina	0.6%	0.6%	0.4%
Diphtheria	0.0%	0.3%	0.2%
Whooping-cough	0.0%	0.0%	0.0%
Typhus	1.9%	6.6%	8.2%
Diarrhoea & Dysentery	1.9%	1.2%	1.7%
Cholera	0.0%	0.2%	0.4%
Other Zymotic Diseases	1.5%	1.2%	1.2%
Cancer	2.5%	3.3%	3.3%
Scrofula & Tabes	3.0%	1.0%	0.9%
Phthisis	22.3%	30.5%	27.1%
Hydrocephalus	0.0%	0.1%	0.1%
Diseases of Brain	8.7%	8.7%	8.7%
Diseases of Heart & Dropsy	5.9%	10.6%	10.9%
Diseases of Lungs	29.2%	10.0%	11.3%
Diseases of Stomach & Liver	10.0%	7.0%	6.6%
Diseases of Kidneys	3.0%	2.5%	2.2%
Diseases of Generative Organs	0.2%	0.3%	0.7%
Diseases of Joints	0.9%	0.8%	0.7%
Diseases of Skin	0.2%	0.3%	0.3%
Childbirth & Metria	1.7%	2.0%	2.0%
Suicide	0.4%	0.9%	0.7%
Other Violent Deaths	2.5%	5.8%	6.8%
Other Causes	3.2%	5.1%	5.0%

Data for 01 Jan 1871 to 31 Dec 1880	Alston P.L.U.	Cumberland P.L.R.C	Newcastle P.L.R.D.
Cause of Death (RG 1870s DS definition)	Percentage	Percentage	Percentage
Small-pox	0.2%	1.8%	2.7%
Measles	0.0%	0.1%	0.0%
Scarlet Fever	0.0%	0.6%	0.3%
Diphtheria	0.5%	0.1%	0.1%
Whooping-cough	0.0%	0.0%	0.0%
Typhus	0.2%	1.4%	1.2%
Enteric Fever	1.1%	2.3%	2.2%
Simple Continued Fever	0.2%	0.4%	0.3%
Puerperal Fever	0.5%	1.4%	1.0%
Diarrhoea & Dysentery	0.5%	0.8%	1.2%
Cholera	0.0%	0.1%	0.1%
Cancer	4.1%	4.2%	3.9%
Scrofula	0.9%	0.4%	0.4%
Tabes Mesenterica	0.2%	0.3%	0.2%
Phthisis	27.5%	25.4%	24.7%
Hydrocephalus	0.0%	0.2%	0.1%
Diseases of Nervous System	7.8%	9.7%	10.8%
Diseases of Circulatory System	5.7%	10.8%	11.4%
Diseases of Respiratory System	20.6%	12.3%	12.3%
Diseases of Digestive System	9.6%	7.3%	7.3%
Diseases of Urinary System	2.3%	2.9%	2.6%
Diseases of Generative System	0.2%	0.5%	0.7%
Childbirth	1.1%	1.3%	1.3%
Suicide	0.2%	1.0%	0.7%
Other Violence	3.9%	6.6%	7.0%
Other Causes	12.6%	8.0%	7.4%

Data for 01 Jan 1881 to 31 Dec 1890	Alston P.L.U.	Cumberland P.L.R.C	Newcastle P.L.R.D.
Cause of Death (RG 1880s DS definition)	Percentage	Percentage	Percentage
Small-pox	0.0%	0.1%	0.5%
Measles	0.0%	0.1%	0.0%
Scarlet Fever	0.0%	0.1%	0.1%
Diphtheria	0.0%	0.1%	0.2%
Whooping-cough	0.0%	0.0%	0.0%
Typhus	0.0%	0.2%	0.6%
Enteric Fever	0.0%	1.3%	1.7%
Simple Continued Fever	0.6%	0.1%	0.2%
Diarrhoea & Dysentery	0.3%	0.4%	0.8%
Cholera	0.3%	0.1%	0.1%
Cancer	5.0%	6.0%	5.5%
Tabes Mesenterica	1.8%	0.4%	0.4%
Phthisis	19.7%	21.7%	23.5%
Other Tuberculosis	3.2%	1.0%	0.8%
Diseases of Nervous System	15.3%	10.9%	10.1%
Diseases of Circulatory System	10.9%	13.8%	13.8%
Diseases of Respiratory System	14.7%	14.3%	13.9%
Diseases of Digestive System	7.1%	6.5%	6.3%
Diseases of Urinary System	2.4%	3.5%	3.4%
Diseases of Generative System	0.6%	0.6%	0.9%
Puerperal Fever	0.6%	1.3%	1.2%
Childbirth	0.6%	1.2%	0.9%
Violence	4.7%	7.5%	6.2%
Other Causes	12.4%	8.8%	8.6%

Data for 01 Jan 1891 to 31 Dec 1900	Alston P.L.U.	Cumberland P.L.R.C	Newcastle P.L.R.D.
Cause of Death (RG 1880s DS definition)	Percentage	Percentage	Percentage
Small-pox	0.0%	0.0%	0.0%
Measles	0.0%	0.0%	0.0%
Scarlet Fever	1.2%	0.2%	0.1%
Diphtheria	1.2%	0.1%	0.1%
Whooping-cough	0.0%	0.0%	0.0%
Typhus	0.0%	0.0%	0.0%
Enteric Fever	0.0%	1.0%	0.8%
Simple Continued Fever	0.0%	0.0%	0.0%
Diarrhoea & Dysentery	0.0%	0.3%	0.2%
Cholera	0.8%	0.1%	0.1%
Cancer	4.7%	7.8%	8.1%
Tabes Mesenterica	1.6%	0.7%	0.5%
Phthisis	17.4%	18.6%	22.8%
Other Tuberculosis	1.9%	1.3%	1.4%
Diseases of Nervous System	5.8%	10.2%	9.3%
Diseases of Circulatory System	15.1%	15.3%	15.5%
Diseases of Respiratory System	8.9%	13.0%	12.0%
Diseases of Digestive System	6.6%	6.3%	7.0%
Diseases of Urinary System	3.9%	4.3%	4.3%
Diseases of Generative System	1.2%	0.5%	1.0%
Puerperal Fever	0.8%	1.2%	0.8%
Childbirth	1.6%	1.6%	1.3%
Violence	3.5%	6.6%	6.8%
Other Causes	24.0%	11.0%	7.8%

Data for 01 Jan 1901 to 31 Dec 1910:	Alston P.L.U.	Cumberland P.L.R.C	Newcastle P.L.R.D.
Cause of Death (RG 1900s DS definition)	Percentage	Percentage	Percentage
Small-pox	0.0%	0.1%	0.2%
Measles	0.0%	0.1%	0.0%
Scarlet fever	0.0%	0.1%	0.0%
Typhus	0.0%	0.0%	0.0%
Influenza	5.0%	1.8%	0.8%
Whooping cough	0.0%	0.0%	0.0%
Diphtheria	0.0%	0.1%	0.0%
Pyrexia	0.0%	0.0%	0.0%
Enteric fever	0.5%	0.8%	0.3%
Diarrhoea & Dysentery	0.0%	0.3%	0.2%
Pulmonary tuberculosis	7.2%	4.7%	7.5%
Phthisis (not otherwise defined)	11.3%	11.1%	11.8%
Tuberculous meningitis	0.0%	0.4%	0.4%
Tuberculous peritonitis	0.5%	0.7%	0.6%
Tabes mesenterica	0.0%	0.1%	0.0%
Other tuberculous diseases	2.3%	1.3%	1.2%
Cancer	8.1%	9.5%	10.3%
Septic diseases	2.3%	0.8%	0.8%
Rheumatic fever & Rheumatism of heart	0.9%	0.9%	0.7%
Pneumonia	2.7%	8.5%	7.4%
Bronchitis	4.1%	3.0%	3.2%
Childbirth & Puerperal fever	1.8%	2.3%	1.6%
Violence	5.4%	7.1%	6.4%
Other Causes	48.2%	46.3%	46.5%

Appendix 9. Dates of Poor Harvests

1740
1755
1756
1766
1767
1768
1770
1771
1794
1795
1796
1799
1800
1801
1812
1813
1816
1828
1829
1831 - 36
1845 Potato crop failure
1846
1847
1851
1855
1856
1867
1877
1881
1888
1889

In the period 1794 to 1813 great inflation and the price of wheat nearly doubled from 46s in 1793 to 90s in 1799, and 106s in 1813.

1816 there was a post war industrial slump and poor harvest.

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⁴⁰ Conditions in mines to which the provisions of the Act 23 and 24 do not apply with reference to the health and safety of persons employed 1864. Kinnaird Report.

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